

THE MOLLUSCAN FAUNA OF THE PLIOCENE STRATA
UNDERLYING THE ADELAIDE PLAINS

PART II — PELECYPODA

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[Read 13 May 1954]

SUMMARY

Part II of the study of the mollusca recovered from borings into the Dry Creek Sands of Pliocene age consists of a systematic revision of the Pelecypoda. The nomenclature of 120 species has been completely revised and 20 species described as new. One new name is introduced.

The geological and environmental background of the fauna, together with an analysis of its relationships with molluscan faunas outside Australia, was discussed in Part I, published in the Transactions of the Society, 77, pp. 42-64, 1954. A map showing the position of the bores from which material was examined was included in Part I.

INTRODUCTION

In the following systematic study, diagnoses of species have been made, where possible, from the holotypes. Where the holotype was not available, the diagnosis has been made from specimens found in borings made available to the writer. Similarly, dimensions cited are, wherever possible, those of the holotype.

Abbreviations o.d. for original designation and s.d. for subsequent designation of type species have been employed throughout.

Collections in which specimens are lodged are abbreviated as hereunder:

Tate Mus. Coll., Univ. of Adelaide, for Tate Museum Collection, University of Adelaide.

S. Aust. Mines Dept. Coll., for Collection of the South Australian Mines Department.

S. Aust. Mus. Coll., for South Australian Museum Collection, Adelaide.

Aust. Mus. Coll., for Australian Museum Collection, Sydney.

Nat. Mus. Coll., for National Museum Collection, Melbourne.

Geol. Surv. Coll., for Collection of the Geological Survey of Victoria, Melbourne.

Melb. Univ. Geol. Dept., for Collection of the Geology Department, University of Melbourne.

B.M. Coll., for British Museum (Natural History) Collection, London.

Class PELECYPODA

Order FILIBRANCHIA

Family NUCULIDAE

Genus NUCULA Lamarck, 1799

Nucula Lamarck, 1799, Mem. Soc. Hist. Nat., Paris, p. 87

Type species (Monotypy) *Arca nucleus* Linné

Subgenus ENNUCULA Iredale 1931

Ennucula Iredale, 1931, Rec. Aust. Mus., 18, (4), p. 202.

(*Ennucula* Iredale. Cotton, 1947, Rec. S.A. Mus., 8, (4), p. 655, 656, *lapsus calami* for *Ennucula*).

Type species (o.d.) *Nucula obliqua* Lamarck

Nucula (*Ennucula*) *kalimnae* Singleton,

pl. 1, fig. 1, 2

Nucula tumida Tenison Woods, Tate, 1886, Trans. Roy. Soc. S. Aust., 8, p. 127, pl. 6, fig. 6a, 6b.

Nucula tenisoni Pritchard, Dennant and Kitson, 1903, Rec. Geol. Surv. Vict., 1, (2), p. 146.

Nucula obliqua Lamarck. N. H. Woods, 1931, Trans. Roy. Soc. S. Aust., 55, p. 150.

Nucula kalimnae Singleton, 1932, Proc. Roy. Soc. Vict., 44, (i.s.), (2), p. 292-94, pl. 24, fig. 7-9.

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Diagnosis—Shell relatively large, heavy, moderately inflated; anterior hinge area gently arcuate, less arched than in the Recent *N. obliqua*; inner ventral margin sometimes obscurely crenulate.

Dimensions—Length 20.5; height 15; thickness (right valve) 6.5 mm.

Type Locality—Cutting on main road above bridge, Jemmy's Point, Kalimna, Victoria; Lower Pliocene.

Location of Holotype—No. 1312, Melb. Univ. Geol. Dept.

Observations—Adelaide specimens are smaller and less heavy than the Gippsland Lakes holotype, but approximate more closely to *kalimnae* than to *obliqua*, which is a broader and less tumid shell, more arched on the anterior dorsal margin. The writer agrees with Singleton that the differences exhibited by Muddy Creek (and also Adelaide) shells are not of sufficient magnitude to warrant specific distinction. There is a lineal descent from *N. tenisoni* through *N. kalimnae* and its Muddy Creek, Adelaide, and Werrikoonian examples, in that order, to the Recent *N. obliqua*, with which Adelaide specimens have been previously identified.

Material—7 valves, maximum dimensions length 11 mm., height 8 mm., from Weymouth's Bore.

Stratigraphical Range—Lower to Upper Pliocene.

Geographical Distribution—Gippsland, Victoria, to Adelaide, South Australia.

Nucula (Ennucula) beachportensis Verco

pl. 1, fig. 3, 4

Nucula beachportensis Verco, 1907. Trans. Roy. Soc. S. Aust., 31, p. 216, pl. 27, fig. 3.

Ennucula beachportensis Verco. Cotton and Godfrey, 1938. Moll. S. Aust., p. 41, text fig. 14

Diagnosis—Very small, anterior dorsal margin straight and elongate, posterior margin short and somewhat truncate, ventral border uniformly curved. Umbo at about posterior one-sixth. Inner margin minutely crenulate.

Dimensions—Length 4.9, height 4.6 mm.

Type Locality—Off Beachport, 40 fathoms. Recent.

Location of Holotype—S. Aust. Mus. Reg. No. D 11310.

Observations—This is a very small species, recorded fossil for the first time. It is distinguishable by its elongate posterior margin and finely crenulate inner ventral margin.

Material—One complete specimen, 10 valves, Hindmarsh Bore.

Stratigraphical Range—Dry Creek Sands and Recent.

Geographical Distribution—Tasmania; Beachport to Cape Jaffa, South Australia.

Nucula (Ennucula) venusta N. H. Woods

pl. 6, fig. 1

Nucula venusta N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 147, pl. 7, fig. 2.

Diagnosis—Solid, ventricose, umbo very prominent, inclined markedly to posterior. Ventral margin flattened or obsolete denticulate.

Dimensions—Length 5.6, height 4.8 mm.

Type Locality—Abattoirs Bore, Adelaide, South Australia; Pliocene.

Location of Holotype—Tate Mus. Coll. Univ. of Adelaide, T 1678

Observations—The one perfect left valve is of approximately the same size as the holotype from the Abattoirs Bore. The chondrophore is very oblique (almost horizontal), narrow, and deeply grooved. The inner ventral margin is obsolete denticulate.

Material—Holotype; four left valves, one almost perfect, and two right valves from Weymouth's Bore.

Stratigraphical Range—Dry Creek Sands.

Geographical Distribution—Abattoirs and Weymouth's Bore, Adelaide.

Genus PRONUCULA Hedley, 1902

Pronucula Hedley 1902. Mem. Aust. Mus., 4, (5), p. 290

Type species (o.d.) *Pronucula decorosa* Hedley

Pronucula morundiana Tate

Nucula morundiana Tate, 1886. Trans. Roy. Soc. S. Aust., 8, p. 128.

Nucula morundiana Tate. Dennant and Kitson, 1903. Rec. Geol. Vict., 1, (2), p. 122.

Nucula morundiana, Tate. N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 150.

Pronucula morundiana Tate. Cotton, 1947. Rec. S. Aust. Mus., 8, (4), p. 655.

Diagnosis—Shell minute, tumid, trigonal, inner margin of valves minutely denticulate, surface sculptured with fine, equal, concentric ribs.

Dimensions—Length 3, height 3, thickness through both valves 2 mm.

Type Locality—River Murray Cliffs near Morgan, South Australia; Lower Miocene.

Location of Holotype—Tate Mus. Coll. Univ. of Adelaide. T 1042A.

Observations—Adelaide material so far examined is very poorly preserved and it is doubtful whether this species is *morundiana*.

Material—1 valve, Hindmarsh Bore.

Stratigraphical Range—Lower Miocene to Pliocene.

Geographical Distribution—Port Phillip Bay, Victoria — Adelaide, South Australia.

Family NUCULANIDAE

Genus NUCULANA Link, 1807

Nuculana Link, 1807. Beschr. Nat. Samml. Univ. Rostock, (3), p. 155

(*Leda* Schumacher, 1817. Ess. Vers. test., p. 55, 173)

Type species (monotypy) *Arca rostrata* Gmelin

Subgenus SCAEOLEDA Iredale, 1929

Scaeoleda Iredale, 1929c. Rec. Aust. Mus., 17, (4), p. 158

Type species (o.d.) *Leda crassa* Hinds

Nuculana (Scaeoleda) woodsii (Tate)

pl. 1, fig. 5.

Leda inconspicua Tenison Woods, 1878. Proc. Linn. Soc. N.S.W., 3, p. 139, pl. 21, fig. 3.

Leda woodsii Tate, 1886. Trans. Roy. Soc. S. Aust., 8, p. 133, pl. 9, fig. 8.

Leda woodsii Tate, Tate and Dennant, 1893. Trans. Roy. Soc. S. Aust., 17, (1), p. 224.

Nuculana woodsii Tate (sp.). Harris, 1897. Cat. Tert. Moll. Brit. Mus., p. 349.

Leda woodsii Tate. Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 122, 138.

Nuculana woodsii Tenison Woods. N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 150.

Diagnosis—Small compressed, with angular posterior ridge from umbo to ventral margin; surface finely ribbed, ribs passing over ridge.

Dimensions—Length 12, height 6; thickness through both valves 3.5 mm.

Type Locality—Muddy Creek, Hamilton, Victoria; (?) Lower Miocene.

Location of Holotype—Tate Mus. Coll. Univ. of Adelaide. T 1039.

Material—Two complete specimens, 5 valves, Hindmarsh Bore, 450-487 feet. 7 valves, Weymouth's Bore, 310-330 feet.

Stratigraphical Range—? Oligocene to Pliocene.

Geographical Distribution—Victoria, Tasmania, South Australia.

Nuculana (Scaeoleda) crebrecostrata (Tenison Woods)

pl. 1, fig. 6

Leda crebrecostrata Tenison Woods, 1877. Proc. Roy. Soc. Tas. for 1876, p. 112.

Leda crebrecostrata Tenison Woods. Tate, 1886. Trans. Roy. Soc. S. Aust., 8, p. 133, pl. 5, fig. 5 a-b.

Leda crebrecostrata T. Woods. Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 123.

Nuculana crebrecostrata T. Woods. N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 150.

Diagnosis—Trigonal, oblong, angular, gaping. Posterior area markedly depressed, cut off by narrow ridge from umbo to ventral margin. Surface sculptured with numerous fine lirae interrupted by ridge.

Dimensions—Length 8, height 5, thickness through both valves 3 mm.

Type Locality—Table Cape, Tasmania.

Location of Holotype—Roy. Soc. Coll., Tasmania.

Material—Four valves, Abattoirs Bore.

Stratigraphical Range—? Oligocene to Pliocene.

Geographical Distribution—Table Cape, Tasmania; Spring Creek, Victoria; Adelaide, South Australia.

Nuculana (Scaeoleda) verconis (Tate).

pl. 1 fig. 7

Leda verconis Tate, 1891. Trans. Roy. Soc. S. Aust., for 1890, 14, p. 264, pl. 11, fig. 4.

Nuculana verconis Verco. N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 147, 150.

Diagnosis—Elongate-ovate, posterior side shortly acuminate, with slightly curved keel. Surface sculptured with about 30 concentric lirae slightly incurved towards the posterior margin.

Dimensions—Length 8, height 5, thickness through both valves 3.5 mm.

Type Locality—Yankalilla Bay, South Australia; Recent.

Location of Holotype—S. Aust. Mus. Reg. No. D 11340.

Material—Two valves, Weymouth's Bore; 5 valves, Abattoirs Bore.

Stratigraphical Range—Dry Creek Sands and Recent.

Geographical Distribution—South Australia.

Superfamily ARCACEA

Family ARCIDAE

Genus ARCA Linné, 1758

Arca Linné 1758. Syst. Nat. ed. 10, 1, p. 693.

Arca Linné. Reinhart, 1935. Mus. Roy. d'Hist. nat. Belg., 11, (13), p. 14 (Synonymy).

Type species (s.d. I.C.Z.N., 1945) *Arca noae* Linné

Arca negata Cotton

Arca navicularis Brug. Tate, 1890 a. Trans. Roy. Soc. S. Aust., 13, (2), p. 175.

Arca navicularis Brug. Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 146.

Arca navicularis Tate. N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 150.

Arca negata Cotton, 1947. Rec. S. Aust. Mus., 8, (4), p. 656, pl. 20, fig. 11, 12.

Diagnosis—Umboes distant, acute, sharp ridge from umbo to posterior ventral margin; sculpture of fine, close radial ribs anterior to angle about 7 per mm.; cancellate in young stages.

Dimensions—Length 24, height 11 mm.

Type Locality—Bore 65, 385-395 feet, Adelaide, South Australia; Pliocene.

Location of Holotype—S. Aust. Mus. Coll., No. 8361.

Material—Holotype; 1 right valve, Abattoirs Bore.

Stratigraphical Range—Dry Creek Sands.

Geographical Distribution—Abattoirs Bore; Bore 65.

Genus BARBATIA Gray, 1842

Barbatia Gray, 1842. Syn. Cont. Brit. Mus., p. 81

Type species (s.d. Gray, 1847) *Arca barbata* Linné

Subgenus BARRATIA s. str.

Barbatia (Barbatia) epitheca Cotton

Arca (Barbatia) pistachia Lamarck. N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 150.

Barbatia epitheca Cotton, 1947. Rec. S. Aust. Mus., 8, (4), p. 657, pl. 20, fig. 14, 17.

Diagnosis—Subquadrangular, anterior rounded, posterior longer and obliquely truncate, surface sculpture of fine and numerous radials crossed by equal concentrics.

Dimensions—Length 23, height 12 mm,

Type Locality—Abattoirs Bore, Adelaide, South Australia; Pliocene.

Location of Holotype—S. Aust. Mus. Coll., No. 8313.

Observations—The species described by Cotton is, according to its author (personal communication), smaller, longer, and more finely sculptured than the Recent *pistachia* with which it was originally identified.

Material—Holotype.

Stratigraphical Range—Dry Creek Sands.

Geographical Distribution—Abattoirs Bore.

Subgenus ACAR Gray, 1857

Acar, Gray, 1857. Ann. Mag. Nat. Hist., ser. 2, 19, p. 360.

Type species (s.d. Woodring, 1925) *Arca gradata* Broderip and Sowerby

Barbatia (Acar) coma (Cotton)

Acar coma Cotton, 1947. Rec. S. Aust. Mus., 8, (4), p. 657, pl. 20, fig. 25, 26.

Diagnosis—Subquadrangular, umbones close, sculpture of radial flattened ribs crossed by frilled lamellae.

Dimensions—Length 23 mm., height 10 mm.

Type Locality—Weymouth's Bore, 345-350 feet; Pliocene.

Location of Holotype—S. Aust. Mus., No. 8404.

Material—Two left valves, Weymouth's Bore, 310-330 feet.

Stratigraphical Range—Dry Creek Sands.

Geographical Distribution—Weymouth's Bore, Adelaide.

Genus CUCULLAEA Lamarck, 1801

Cucullaea Lamarck, 1801. Syst. Anim. sans Vert., p. 116

Type species (s.d. Schmidt, 1818) *Cucullaea auriculifera*

Lamarck = *Arca concamera* Bruguière

Cucullaea corioensis McCoy

pl. 1, fig. 8, 9

Cucullaea corioensis McCoy, 1876. Prod. Pal. Vict., 3, p. 32, pl. 27, fig. 4, 5.

Cucullaea corioensis McCoy. Tate, 1886. Trans. Roy. Soc. S. Aust., 8, p. 144.

Cucullaea corioensis McCoy. Johnston, 1888. Geol. Tas., pl. 29, fig. 4, 4a.

Cucullaea corioensis McCoy. Tate and Dennant, 1893. Trans. Roy. Soc. S. Aust., 17, (1), p. 224.

Cucullaea corioensis McCoy. Pritchard, 1896. Proc. Roy. Soc. Vict., 8, (n.s.), p. 131.

Cucullaea corioensis McCoy. Harris, 1897. Cat. Tert. Moll. Brit. Mus., 1, p. 336.

Cucullaea corioensis McCoy. Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), pp. 122, 138, 145 (pars).

Cucullaea corioensis McCoy. Chapman and Gabriel, 1914. Proc. Roy. Soc. Vict., 26, (2), (n.s.), p. 302.

Cucullaea corioensis McCoy. Singleton, 1932. Proc. Roy. Soc. Vict., 44, (n.s.), (2), p. 300-303.

Diagnosis—Large, heavy, obliquely trapezoidal; ratio anterior to posterior part of hinge generally less than 1. Sculpture of fine radiating ridges, 3 per mm. at 8 mm. from umbo, crossed by closely spaced growth lines with undulations on the ribs.

Type Locality—Bird Rock, near Spring Creek, Victoria.

Location of Holotype—National Museum, Melbourne.

Material—Five complete, 1 broken valve, Weymouth's Bore; 13 valves, Lower Bds, Muddy Creek, L4789, L6598, L42238-42, 70411, B.M. Coll. 1 valve Werribee, Victoria; 5 valves River Murray, South Australia.

Stratigraphical Range—? Oligocene to Pliocene (F.A.S., N.H.L.).

Geographical Distribution—Victoria, Tasmania, South Australia.

Cucullaea praelonga Singleton

pl. 5, fig. 15

- Cucullaea corioensis* McCoy, 1876. Prod. Pal. Vict., 3, pl. 27, fig. 3 (?), 5 a (non 4, 5).
Cucullaea corioensis McCoy. Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 138.
Cucullaea corioensis praelonga Singleton, 1932. Proc. Roy. Soc. Vict., 44, (n.s.), (2), p. 303-304, pl. 26, fig. 20 a, b.
Cucullaea praelonga (Singleton 1932). Singleton, 1945. Proc. Roy. Soc. Vict., 56, (n.s.), (2), p. 257.
Cucullaea praelonga Singleton, Cotton, 1947. Rec. S. Aust. Mus., 8, (4), p. 658.

Diagnosis—Less inequilateral than *corioensis*, less tumid, ratio anterior to posterior part of hinge greater than 1.

Dimensions—Length 61.5, height 51, inflation (right valve) 21 mm.; length anterior to hinge 7.5, of hinge 42.5, posterior to hinge 11.5; maximum height of hinge from ventral border 43.5 mm. Ratio of anterior to posterior part of hinge 1.13.

Type Locality—Forsyth's, Grange Burn, near Hamilton, Victoria; Lower Pliocene.

Location of Holotype—No. 1320 Melbourne University Geology Department.

Observations—Cotton (1947) has recorded this species from the Dry Creek Sands, although the exact locality is not specified. He remarks that specimens are common in the "Adelaidean" and appear to be *praelonga* rather than *corioensis*. With the exception of one sample from Kooyonga Bore, the specimens examined satisfy the general criterion for *corioensis* established by Singleton (1931, p. 302); i.e., the ratio anterior: posterior part of hinge is less than 1. The writer is therefore in agreement with Singleton that Adelaide examples are *corioensis*. It seems possible that one true species only is represented, and that *praelonga* is, as originally described, merely a subspecies of *corioensis*. A wider range of specimens, numerically and geographically, should be examined to determine statistically whether two species are present or not.

Material—1 valve, Kooyonga Bore.

Stratigraphical Range—Lower Pliocene and Dry Creek Sands.

Geographical Distribution—Gippsland, Victoria; Adelaide, South Australia.

Family LIMOPSIDAE

Genus LIMOPSIS Sassi, 1827

- Limopsis* Sassi, 1827. Giorn. Ligust., 1, (5), p. 476.
 (*Trigonocaelia* Nyst and Galeotti, 1835. Bull. Acad. Roy. Bruxelles, 2, p. 289.)
 (*Pectunculina* d'Orbigny, 1844. Pal. France, Cret., 3, (Lam.), p. 182.)
 (*Cosmetopsis* Rovereto, 1898. Atti Soc. Ligust., 9, pp. 162, 177.)

Type species (s.d. Gray, 1847) *Arca aurita* Brocchi

Subgenus LIMOPSIS s. str.

(*Versipella* Iredale, 1931. Rec. Aust. Mus., 18, p. 203.)

Limopsis (Limopsis) beaumariensis Chapman

pl. 5, fig. 7

- Limopsis forskali* A. Adams. Tate, 1897. Trans. Roy. Soc. S. Aust., 21, p. 58.
Limopsis forskali A. Adams. Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 122 (in part), p. 138, 146.
Limopsis beaumariensis Chapman, 1911. Proc. Roy. Soc. Vict., 23, (n.s.), (2), p. 423-5, pl. 84, fig. 6; pl. 85, fig. 12.
Limopsis beaumariensis Chapman. Chapman, Crespin, and Koble, 1928. Rec. Geol. Surv. Vict., 5, (1), p. 152.
Limopsis beaumariensis Chapman, N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 150.
Limopsis affinitalis Chapman. N. H. Woods, *ibid.*
Limopsis beaumariensis Chapman. Crespin, 1943. Min. Res. Surv. Bull., 9, p. 93.

Diagnosis—Subtrigonal, hinge line strongly arched; sculptured with slightly undulating primary riblets with from 0 to 4 secondary riblets between, crossed by less conspicuous growth lines.

Dimensions—Length 21, height 20·25, inflation (1 valve) 6, length of hinge line 9·25; height of ligament pit 1·75 mm.

Type Locality—Beaumaris, Victoria; Lower Pliocene.

Location of Holotype—Geol. Surv. Vic. Coll.

Observations—Although some of the "genera" created by Iredale in 1929 and 1931 for species of *Limopsis* are separable from *Limopsis* s. str., *Versipella* created for *Limopsis tenisoni* Tenison-Woods appears to have no recognizable morphological characters to separate it from the type species *Limopsis surita* Brocchi. *Versipella* is therefore considered a synonym of *Limopsis* s. str.

Material.—Twelve valves, Weymouth's Bore, 2 valves Abattoirs Bore.

Stratigraphical Range—Lower Miocene to Dry Creek Sands.

Geographical Distribution—Gippsland, Victoria; Adelaide, South Australia.

Limopsis maccoyi Chapman

pl. 1, fig. 10

Limopsis belcheri Adams and Reeve. McCoy, 1875. Prod. Pal. Vict., 2, p. 25, pl. 19, fig. 8, 9.

Limopsis forskali Adams. Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 122, 138, 146 (in part).

Limopsis maccoyi Chapman, 1911. Proc. Roy. Soc. Vict., 23, (n.s.), (2), p. 421-2, pl. 83, fig. 2; pl. 85, fig. 8.

Limopsis maccoyi Chapman. Chapman, Crespin, and Keble, 1923. Rec. Geol. Surv. Vict., 1, (2), p. 152.

Limopsis maccoyi Chapman. Crespin, 1943. Min. Res. Surv. Bull., 9, p. 93.

Diagnosis—Shell elongate-ovate, very oblique, radial ornament stronger than concentric, which is waving and fimbriate. Teeth short, curved, comparatively few.

Dimensions—Length 28, height 25, inflation (1 valve) 5·6, length of hinge 8·4 mm.

Type Locality—? Balcombe Bay, Victoria; Lower Miocene.

Location of Holotype—Naitonal Museum, Melbourne.

Material—Two valves, Abattoirs Bore. One valve, Tennant's Bore.

Stratigraphical Range—Lower Miocene to Pliocene.

Geographical Distribution—Gippsland, Vict. — Adelaide, S. Aust.

Limopsis eucosmus Verco

pl. 1, fig. 11

Limopsis eucosmus Verco, 1907. Trans. Roy. Soc. S. Aust., 31, pl. 219, pl. 27, fig. 2.

Limopsis eucosmus Verco, Cotton and Godfrey, 1938. Moll. S. Aust., p. 55, text fig. 30.

Diagnosis—Small, orbicular, strongly sculptured with flat concentric ribs of varying width and numerous radial lirae increasing in number by intercalation. Concentrics scalloped by radials and a tubercle generally formed at intersection. Interspaces depressed and circular.

Dimensions—Length 7·5, height 8, inflation (both valves) 3·25 mm.

Type Locality—Off Cape Jaffa, 90 fathoms; Recent.

Location of Holotype—S. Aust. Mus., Reg. No. 13048.

Observations—One valve only belonging to this species, its first fossil record, was recovered from Weymouth's Bore. Its small size and strong sculpture distinguish it from other fossil species.

Material—Hypotype, Weymouth's Bore.

Stratigraphical Range—Dry Creek Sands and Recent.

Geographical Distribution—Tasmania to Western Australia.

Limopsis (Limopsis) vixornata Verco

pl. 1, fig. 12

Limopsis vixornata Verco, 1907. Trans. Roy. Soc. S. Aust., 31, p. 219, pl. 27, fig. 1.

Limopsis vixornata Verco. Cotton and Godfrey, 1938. Moll., S. Aust., p. 54, fig. 36.

Diagnosis—A very small *Limopsis*, orbicularly oval, smooth but for concentric growth striae except in the posterior area where the concentric sculpture is crossed by radial striae. Hinge curved with eleven diverging teeth in a continuous series.

Dimensions—Length 6.4, height 5.7 mm.

Type Locality—Neptune Islands, 45 fathoms; Recent.

Location of Holotype—S. Aust. Mus., Reg. No. D13047.

Material—Figured hypotype and one other valve, Weymouth's Bore, 28 valves, Hindmarsh Bore.

Stratigraphical Range—Dry Creek Sands and Recent.

Geographical Distribution—Beachport — St. Francis Island, S. Aust.

Genus LISSARCA E. A. Smith, 1879

Lissarca Smith, 1879. Phil. Trans. Roy. Soc., 168, p. 19, pl. 9, fig. 17.

(*Austrosarepta* Hedley, 1899. Proc. Linn. Soc. N.S.W., 24, p. 430.)

Type species (monotypy) *Lissarca rubrofusca* E. A. Smith

Lissarca rubricata (Tate)

pl. 1, fig. 14

Limopsis rubricata Tate, 1887 a. Trans. Roy. Soc. S. Aust., 9, p. 71.

Lissarco rubricata Tate, N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 150.

Lissarca rubricata Tate, Cotton and Godfrey, 1938. Moll., S. Aust., p. 58, fig. 40.

Diagnosis—Obliquely oval, inflated, umbo prominent, sculpture of regular concentric striae, margins of valves crenulate.

Dimensions—Length 2.75, height 3, inflation (both valves) 1.75 mm.

Type Locality—32 fathoms, Backstairs Passage, S. Aust.; Recent.

Location of Holotype—S. Aust. Museum.

Material—Six valves, Hindmarsh Bore; 4 valves, Recent, Vict., B. M. Coll.

Stratigraphical Range—Dry Creek Sands and Recent.

Geographical Distribution—Victoria, Tasmania, South Australia to 80 miles west of Eucla.

Lissarca rhomboidalis Verco

pl. 1, fig. 16

Lissarca rhomboidalis Verco, 1907. Trans. Roy. Soc. S. Aust., 31, p. 221, pl. 27, fig. 7.

Diagnosis—Ovate, rhomboid, inequilateral, about twice as long behind the umbo as in front. Three or 4 marginal teeth at anterior, 4 at postdorsal and 3 or 4 obsolete teeth at ventral border.

Dimensions—Length 2.4, height 2 mm.

Type Locality—Macdonnell Bay and Guichen Bay, in shell sand; Recent.

Location of Holotype—No. 13050, S. Aust. Museum.

Material—Six valves, Hindmarsh Bore 450-487 feet, 3 valves Weymouth's Bore.

Stratigraphical Range—Dry Creek Sands and Recent.

Geographical Distribution—Victoria, Tasmania, South Australia to Macdonnell Bay.

Family GLYCYMERIDAE

Genus GLYCYMERIS da Costa, 1778

Glycymeris da Costa, 1778. Hist. Nat. Test. Brit., p. 168.

Glycymeris Nicol, 1945. Jour. Pal., 19, (6), p. 616 (synonymy).

Type species (absolute tautonymy) *Arca glycymeris* Linné

Subgenus TUCETONA Iredale, 1931

Tucetona Iredale, 1931. Rec. Aust. Mus., 18, (4), p. 202.

Type species (o.d.) *Pectunculus flabellatus* Tenison Woods

Glycymeris (Tucetona) convexa (Tate)

- Pectunculus convexus* Tate, 1886. Trans. Roy. Soc. S. Aust., 8, p. 138, pl. 11, fig. 7 a, b.
Pectunculus convexus var. Tate, 1890. id. 13, (2), p. 175.
Pectunculus convexus Tate and Dennant, 1893, id. 17, (1), p. 224.
Pectunculus convexus Tate. Harris, 1897. Cat. Tert. Moll. Brit. Mus., 1, p. 342.
Glycymeris convexa Tate. Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 122, 138, 146.
Glycymeris maccayi Johnston sp. Chapman and Gabriel, 1914. Proc. Roy. Soc. Vict., 26, (n.s.), (2), p. 304, pl. 24, fig. 5 (non 1-4).
Glycymeris maccayi Johnston sp. Chapman, 1916. Rec. Geol. Surv. Vict., 3, (4), pl. 67, fig. 5 (non 1-4).
Glycymeris convexa Tate sp. Chapman and Singleton, 1925. Trans. Roy. Soc. Vict., 37, (n.s.), (1), p. 38, pl. 2, fig. 16 a, 16 b, 17-20; pl. 4, fig. 12, 13.
Glycymeris convexa Tate. N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 150.
Glycymeris convexa Tate. Crespin, 1943. Min. Res. Surv. Bull. 9, p. 93.
Tucetona crama Cotton, 1947. Rec. S. Aust. Mus., 8, (4), p. 660, pl. 20, fig. 1, 2.

Diagnosis—Solid, tumid, with about 24 rounded elevated radial ribs crossed by thick concentric waving laminae.

Dimensions—Length 31, height 33, inflation (both valves) 22 mm.

Type Locality—Muddy Creek, Hamilton, Victoria; Lower Pliocene.

Location of Holotype—Tate Mus. Coll., Univ. of Adelaide.

Observations—This species is fairly common in the borings in the Adelaide district. Chapman and Singleton noted (1925, p. 38) in Adelaide examples a tendency to flattening of the ribs and development of concentric sculpture; on these features Cotton has raised the new species *crama*. Flattening of the ribs is not, however, a diagnostic or constant feature; all specimens from Weymouth's Bore show very little if any flattening, while some topotypes have flattened ribs; nor is the development of the concentric sculpture a uniform characteristic, either in the Weymouth's Bore specimens under present consideration or in Muddy Creek topotypes.

Increasing convexity with age is usual in the species. Juveniles are generally only slightly convex, while gerontic specimens can be extremely so. The feature is characteristic also of the type species *G. glycymeris* (Linné), as exemplified in a range of samples from the Red Crag of the English Pliocene in the collection of the Geological Survey of Great Britain.

The mode of preservation and the difference in habitat between Adelaide and Muddy Creek shells is here also taken into consideration in accepting Chapman and Singleton's determination of the species.

Material—Three topotypes, Muddy Creek, L4827, L6592, B.M. Coll.; seven valves Weymouth's Bore, numerous valves Hindmarsh Bore.

Stratigraphical Range—Lower Pliocene and Dry Creek Sands.

Geographical Distribution—Gippsland, Victoria. — Adelaide, South Australia.

Subgenus **TUCETILLA** Iredale, 1939

Tucetilla Iredale, 1939. Barr. Reef Exped. Scient. Repts. Brit. Mus. Nat. Hist., 5, (6), p. 300.

Type species (original designation) *Glycymeris capricornea* Hedley

Glycymeris (Tucetilla) tenuicostata (Reeve)

- Pectunculus tenuicostatus* Reeve, 1843. Proc. Zool. Soc., Lond., p. 80.
Pectunculus tenuicostatus Reeve, 1843. Couch. Icon., 1, pl. 6, fig. 35.
Pectunculus tenuicostatus Reeve, Lamy, 1912. Journ. de Conch., 59, p. 103-6, pl. 3, fig. 3.
Glycymeris tenuicostata Reeve, Gatliff and Gabriel, 1910 b. Proc. Roy. Soc. Vict., 23, (n.s.), (1), p. 97.
Glycymeris tenuicostata Reeve sp. Chapman and Singleton, 1925. Proc. Roy. Soc. Vict., 37, (n.s.), (1), p. 36-7.
Glycymeris tenuicostata Reeve. N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 150.
Glycymeris tenuicostata Reeve. Crespin, 1943. Min. Res. Surv. Bull. 9, p. 93.
Tucetilla rola Cotton, 1947. Rec. S. Aust. Mus., 8, (4), p. 659.

Diagnosis—Rounded, moderately inflated, surface ornamented, with 40-45 riblets transversed by concentric growth threads which become beaded where they cross the radial costae.

Dimensions—Length 29·8, height 28·8, inflation (both valves) 19 mm.

Type Locality—"Australia"; Recent.

Location of Holotype—B.M. Coll., No. 1950-6-6-1-3.

Observations—The species *Tucetilla rota* is identical in shape and sculpture and the number of hinge teeth, the described diagnostic characters, with the holotype of *Glycymeris tenuicostata*. *G. tenuicostata* has been found consistently from Balcombian to Werrikoian in southern Australia. It is recorded from Abattoirs Bore, and one example from Hindmarsh Bore, a young and worn shell length 8, height 7 mm., is undoubtedly *tenuicostata*. The species is represented in the British Museum by specimens other than the holotype having the following dimensions:

Length 32, height 32, inflation (both valves), 20 mm.

Length 29·8, height 27, inflation (both valves), 18 mm.

Length 19, height 17 mm., inflation not measured as specimen glued to tablet.

Material—Holotype: Three complete specimens, Brit. Mus. Coll.; 1 valve Hindmarsh Bore, 17 valves Abattoirs Bore.

Stratigraphical Range—Miocene to Recent.

Geographical Distribution—Queensland — South Australia.

Suborder SCHIZODONTA

Superfamily PTERIACEA

Family PTERIIDAE

Genus PINCTADA Röding, 1798

Pinctada Röding ex Bolten 1798. Mus. Bolt, (2), p. 166.

Pinctada Thiele, 1935. Handb. Syst. Weicht., p. 803 (synonymy).

Type species (s.d. Iredale, 1915) *Mytilus margaritiferus* Linné

Pinctada crassicardia (Tate)

Meleagrina crassicardia Tate, 1886. Trans. Roy. Soc. S. Aust., 8, p. 121-2, pl. 9, fig. 6, 10.

Margaritifera crassicardia Tate. Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 120, 138.

Pinctada crassicardia Tate. N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 150.

Pinctada crassicardia Tate. Cotton, 1947. Rec. S. Aust. Mus., 8, (4), p. 660.

Diagnosis—Slightly oblique, hinge line long, straight, anterior ear of left valve short, tumid, acute, of right valve depressed; posterior wing, small pointed. Surface with distant growth striae.

Dimensions—Young example: Length of hinge 37, greatest length measured from umbō to post-ventral margin 37 mm. Average sized adult specimens measure 60 mm. in length.

Type Locality—Muddy Creek, Hamilton, Victoria; Lower Pliocene.

Location of Holotype—Tate Mus. Coll., Univ. of Adelaide.

Material—One large broken valve, Tennant's Bore.

Stratigraphical Range—Lower Miocene to Pliocene.

Geographical Distribution—Gippsland, Victoria — Adelaide, South Australia.

Family PINNIDAE

Genus PINNA Linné, 1758

Pinna Linné, 1758. Syst. Nat. ed. 10, p. 707.

Type species (s.d. Children, 1823) *Pinna rudis* Linné.

Subgenus ATRINA Gray, 1847

Atrina Gray, 1847. Proc. Zool. Soc. Lond., p. 199.

Type species (monotypy) *Pinna vexillum* Born.

Pinna (Atrina) semicostata Tate

Pinna semicostata Tate, 1886 Trans. Roy. Soc. S. Aust., 8, p. 122, pl. 12, fig. 9.

Pinna semicostata Tate, Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 138.

Atrina semicostata Tate, Cotton, 1947. Rec. S. Aust. Mus., 8, (4), p. 655.

Dimensions—Length of dorsal margin 130, width 65, inflation (both valves) 43 mm.

Type Locality—Adelaide; Pliocene.

Location of Holotype—Tate Mus. Coll., Univ. of Adelaide. T997.

Observations—It is somewhat difficult to tell whether Tate's type is a *Pinna* s.str. or an *Atrina*, although the shape suggests *Atrina*. The writer followed Winkworth (1929) and Thiele (1935-) in the use of *Atrina* as a subgenus. It is separable from *Pinna* only on the absence of the internal medial angulation and the resultant division of the muscular impression.

Material—Holotype Tate Mus. Coll. T997.

Stratigraphical Range—South Australian Pliocene.

Geographical Distribution—Aldinga-Adelaide, South Australia.

Family OSTREIDAE

Genus OSTREA Linné, 1758

Ostrea Linné, 1758. Syst. Nat. ed. 10, p. 696.

Type species (s.d. Children, 1823) *Ostrea edulis* Linné.

Subgenus LOPHA Röding, 1798

Lopha Röding ex Boltz, 1798. Mus. Bolt., 2, p. 168.

Type species (s.d. Dall, 1898) *Ostrea cristagalli* Gmelin

Lopha Boltz in Röding, 1798. Eames, 1951, Phil. Trans. Roy. Soc., ser. B. 627, 235, p. 362 (synonymy).

Ostrea (Lopha) hyotidoidea Tate

pl. 5, fig. 1

Ostrea hyotis Linné. Tate, 1886. Trans. Roy. Soc. S. Aust., 8, p. 96, pl. 6, fig. 5.

Ostrea hyotis Linné. Dennant, 1889. Trans. Roy. Soc. S. Aust., 11, p. 49.

Ostrea hyotis Linné. Harris, 1897. Cat. Tert. Moll. Brit. Mus., 1, p. 299.

Ostrea hyotidoidea Tate, 1899. Trans. Roy. Soc. S. Aust., 12, p. 268.

Ostrea hyotidoidea Tate, Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 118.

Ostrea hyotidoidea Tate. Crespin, 1943. Min. Res. Surv. Bull. 9, p. 94.

Lopha hyotidoidea (Tate). Cotton, 1947. Rec. S. Aust. Mus., 8, (4), p. 661.

Diagnosis—Irregular, with flattish radial ridges crossed by foliaceous scales, sometimes somewhat spinose.

Type Locality—River Murray Cliffs; Lower Miocene.

Location of Holotype—Tate Mus. Coll., Univ. of Adelaide. T880.

Description of Hypotype—Shell of moderate size, fairly solid, irregularly subquadrate, with several irregular flat obtuse radial folds, crossed by numerous irregular and waving foliaceous concentric scales which are sometimes slightly spinose. Margins of valves expanded, not plicated. Umbones depressed, resilifer broad, triangular. Left valve convex.

Dimensions—Length 65, height 60 mm.

Hypotype—B.M. Coll. No. 6581, Lower Beds, Muddy Creek, Victoria.

Observations—This long-ranging species is not uncommon in some borings in the Adelaide Basin. None of the specimens available are larger than about 65 mm. The species resembles the nepionic stages of *O. hyotis* Linné, but of the examples examined only the holotype shows a tendency to the sharply angular plications of the adult *hyotis* which are diagnostic of the subgenus *Lopha*.

Material—Holotype: Two valves Lower Beds, Muddy Creek, L6581. One specimen River Murray Cliffs. 48803 B.M. Coll.; numerous specimens Abattoirs Bore; 2 valves Hindmarsh Bore.

Stratigraphical Range—Lower Miocene to Pliocene.

Geographical Distribution—Gippsland, Victoria. — Adelaide, South Australia.

Subgenus *OSTREA* s.str.

Ostrea (Ostrea) arenicola Tate

Ostrea arenicola Tate, 1886. Trans. Roy. Soc. S. Aust., 8, p. 97, pl. 10, fig. 6.

Ostrea arenicola Tate. Dennant and Kitson, 1903. Rec. Geol. Surv. Vist., 1, (2), p. 138.

Ostrea angasi Sowerby, *ibid.*, p. 145.

Ostrea arenicola Tate. Cotton, 1947. Rec. S. Aust. Mus., 8, (4), p. 661.

Diagnosis—Solid, valves unequal, lower valve with depressed radial ribs and foliaceous lamellae; upper valve smaller and flattish, with imbricating lamellae.

Dimensions—Length 85, height 80, inflation (both valves) 25 mm.

Type Locality—Aldinga, South Australia, Pliocene.

Location of Holotype—Tate Mus. Coll., Univ of Adelaide. T921.

Observations—This oyster is common and numerous at the richly fossiliferous level in the Adelaide Basin. It is distinct from the *Ostrea startiana* of the River Murray Pliocene.

Material—One valve, Aldinga Bay, S. Aust. L10523, B.M. Coll. Numerous valves, Hindmarsh Bore.

Stratigraphical Range—Pliocene.

Geographical Distribution—Gippsland, Victoria. — Adelaide, South Australia.

Superfamily TRIGONIACEA

Family TRIGONIIDAE

Genus NEOTRIGONIA Cossmann, 1912

Neotrigonia Cossmann, 1912. Ann. de Paleo., 7, (2), p. 11.

Type species (o.d.) *Trigonia pectinata* Lamarck

Neotrigonia trua Cotton

Neotrigonia acuticostata McCoy. N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 150.

Neotrigonia trua Cotton, 1947. Rec. S. Aust. Mus., 8, (4), p. 661-2, pl. 20, fig. 5-6.

Diagnosis—Shell trigonal, convex, with about 28 radiating ribs closely set with numerous lamellose tubercles.

Dimensions—Length 26, height 25 mm.

Type Locality—Abattoirs Bore, Adelaide; Pliocene.

Location of Holotype—S. Aust. Museum. P. 8360.

Observations—*N. trua* is distinguishable from its nearest fossil ally *N. acuticostata* by its more trigonal shape, and by its greater convexity particularly in the umbonal region. There are 28 ribs generally in *N. trua* compared with 32 in *N. acuticostata*. *N. trua* would appear to be intermediate in form between the Cheltenhamian-Kalimnan *acuticostata* and the Recent South Australian *bednalli* which has 26 ribs.

Material—Holotype: Four topotypes, Abattoirs Bore.

Stratigraphical Range—Dry Creek Sands.

Geographical Distribution—Abattoirs Bore, Adelaide.

Suborder ISODONTA

Superfamily PECTINACEA

Family PECTINIDAE

Genus CHLAMYS Röding, 1798

Chlamys Röding ex Bolten, 1798. Mus. Bolt., p. 161.

Type species (s.d. Hermannsen, 1847) *Pecten islandicus* Muller

Subgenus CHLAMYS s.str.

(*Mimachlamys* Iredale, 1929 c, *ibid.*, p. 162.)

(*Mimachlamys* Iredale, 1929 c, *ibid.*, p. 162.)

(*Belchlamys* Iredale, 1929 c, *ibid.*, p. 164.)

***Chlamys (Chlamys) polyaktinos* sp. nov.**

pl. 4, fig. 16

Chlamys peroni Tate. N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 65, (1), p. 150.

Diagnosis—Suborbicular, with from about 24 increasing by intercalation to 48 narrow riblets carrying imbricating scales with shagreen sculpture in the interspaces.

Description of Holotype—(Left valve). Shell small, rather thin, elongately suborbicular, slightly convex, sculptures with about 24 radial riblets, increasing by intercalation to 48 towards the ventral margin, of sub-equal strength, covered towards the ventral margin with imbricating scales. Interspaces finely shagreened. Auricles unequal, posterior auricle small, dorsal margin nearly horizontal, with about 10 fine rays with imbricating scales; anterior auricle larger, dorsal margin oblique, primary rays five with two secondary rays, crossed by fine growth lamellae, not scaly; byssal sinus moderately wide and deep.

Dimensions—Length 22, height 23.5, inflation (one valve), 3 mm.

Type Locality—Abattoirs Bore, Adelaide; Pliocene.

Location of Holotype—Tate Mus. Coll., Univ. of Adelaide. F15120.

Observations—Although it resembles it fairly closely, this species is not the Balcombian *C. peroni* (Tate), from which it is distinguished easily by the shagreen sculpture between the riblets. It is close to the Recent *C. aktinos* Petterd, from which it differs in the more numerous riblets and in shape, being less elongate. The posterior auricle is larger than in *aktinos*.

Material—Holotype and 16 paratypes, Abattoirs Bore (single valves). One valve Hindmarsh Bore, two fragments Tennant's Bore,

Stratigraphical Range—Dry Creek Sands.

Geographical Distribution—Adelaide District.

***Chlamys (Chlamys) antiaustralis* (Tate)**

pl. 5, fig. 11

Pecten asperimus var. Tate, 1882. Trans. Roy. Soc. S. Aust., 5, p. 44.*Pecten antiaustralis* Tate, 1886. Trans. Roy. Soc. S. Aust., 8, p. 106, pl. 9, fig. 7 a-c.*Pecten antiaustralis* Tate. Harris 1897. Cat. Tert. Moll. Brit. Mus., 1, p. 315-6.*Pecten antiaustralis* Tate, 1899. Trans. Roy. Soc. S. Aust., 23, (2), p. 269.*Pecten antiaustralis* Tate. Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 138.*Chlamys asperimus antiaustralis* (Tate, 1886) Gatliff and Singleton 1930. Proc. Roy. Soc. Vict., 42, (n.s.), (2), p. 71-3, pl. 2, fig. 3; pl. 3, fig. 6, 7; pl. 4, fig. 10 a, b.*Chlamys antiaustralis* Tate. N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 150.*Mimachlamys antiaustralis* Tate. Cotton, 1947. Rec. S. Aust. Mus., 8, (4), p. 655.

Diagnosis—Suborbicular, with about 25 radiating ribs flanked by one or two smaller ribs on each, ribs convex, wider than in *C. asperima* crossed by erect lamellae. Ears large, unequal; anterior ear of right valve with finer and more numerous radial ribs than in *asperima*.

Dimensions—Length 58, height 58, inflation (both valves) 25 mm.

Type Locality—Aldinga Bay, South Australia; Pliocene.

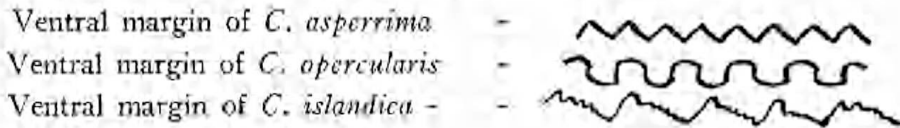
Location of Holotype—Tate Mus. Coll., Univ. of Adelaide.

Observations—Examination of a series of specimens of *Chlamys islandica* (Muller), type species of *Chlamys*, of *C. asperima* Lamarck, type species of *Mimachlamys* and of *P. opercularis*, type species of *Aequipekten* with which Thiele has synonymized *Mimachlamys*, sufficiently indicates that there is no sub-generic distinction between *Mimachlamys* and *Chlamys*.

The broad essential differences between *islandica* and *asperima* are the somewhat unequal sculpture between the valves in *islandica*, and the marked serration of the ventral margin, with corresponding interlocking of the valves, in *asperima*. The latter is, however, a variable feature and occurs to a modified degree in some specimens of *islandica*; it is a specific character dependent upon the degree of development of the primary ribs. In *asperima* they are strongly

and sharply developed, in *islandica* the subsidiary ribs become larger and separate from the primary ribs. *Opercularis* is a round, broader shell with an undulating rather than a serrated margin.

Viewed in profile the ventral margins appear thus:



Other features considered by Iredale to be diagnostic of *Mimachlamys* are shared by all three species. The relative convexity of the valves is slightly variable, but the right valve is flatter than the left in all three.

The genus *Chlamys* s.str. is represented in the New Zealand Tertiary by 17 species (Marwick, 1928, p. 453) ranging from probably late Oligocene. The writer has not seen actual specimens of *C. chathamensis* Marwick (1928, p. 456, figs. 18, 19), but from the figures the species appears to be generically comparable with *asperrima*.

In the European Tertiary, the genus s.str. is represented by the *Chlamys varia* series (*C. varia*, *C. costai*, *C. justiana*, *C. jakloweciana*, *C. multistriata*, *C. islandica*, and *C. princeps* (Roger, 1939, p. 150-172, pl. 27, pl. 28, figs. 1-6) while *islandica* forms a connecting link between European and North American faunas.

The genus s.str. is represented in the post-Miocene of the Red Sea region by *C. squamosa*, *C. squamata*, *C. senatoria*, and *C. senatoria* var. *alexandri* (Cox, 1929, p. 190-1). Iredale (1939, p. 350) has placed *senatoria* in *Mimachlamys*, thus suggesting its synonymy with *Chlamys*.

Material—Numerous specimens, Hindmarsh Bore 450-487 feet, 2 valves Thebarton Bore, 11 valves and fragments Kooyonga Bore, 3 valves Adelaide, 42698; 2 valves Muddy Creek L 6579, 1 valve South Australia, 33789 B.M. Coll.

Stratigraphical Range—Pliocene.

Geographical Distribution—Western Victoria — Adelaide, South Australia.

Subgenus *EQUICHLAMYS* Iredale, 1929

Equichlamys Iredale, 1929 c. Rec. Aust. Mus., 17, (4), p. 162.

Type species (o.d.) *Pecten bifrons* Lamarck

Chlamys (*Equichlamys*) *consobrina* (Tate)

Pecten consobrinus Tate, 1886. Trans. Roy. Soc. S. Aust., 8, p. 104, pl. 3, fig. 6.

Pecten consobrinus Tate, Tate and Dennant, 1893. id., 17, (1), p. 224.

Pecten consobrinus Tate, Harris, 1897. Cat. Tert. Moll. Brit. Mus., p. 317.

Pecten consobrinus Tate, Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 133.

Pecten consobrinus Tate, N. H. Woods 1931. Trans. Roy. Soc. S. Aust., 55, p. 150.

Equichlamys consobrinus Tate, Cotton 1947. Rec. S. Aust. Mus., 8, (4), p. 654.

Diagnosis—Subinequivalve, with 8 radial folds and about 100 rigid, unequal riblets separated by minutely granular interspaces usually broader than the riblets.

Dimensions—Length 85 height 85 mm.

Type Locality—Aldinga Bay, South Australia; Pliocene.

Location of Holotype—Tate Mus. Coll., Univ of Adelaide.

Material—Several fragments, Abattoirs Bore; several fragments, Tennant's Bore; 3 valves, Aldinga Bay, S. Aust. L 10533, L 9919 (topotypes) B.M. Coll.

Stratigraphical Range—South Australian Pliocene.

Geographical Distribution—Aldinga Bay — Adelaide, South Australia.

Subgenus *MESOPEPLUM* Iredale, 1929

Mesopeplum Iredale, 1929 c. Rec. Aust. Mus., 17, (4), p. 163.

Type species (o.d.) *Mesopeplum caroli* Iredale

Chlamys (Mesopeplum) incerta (T. Woods)

pl. 5, fig. 8, 9

Pecten coarctatus (?) Sturt, 1833. Two Exp. S. Aust., 2, p. 254, pl. 3, fig. 13.*Pecten coarctatus* (?) Tenison Woods, 1862. Geol. Obs. S. Aust., p. 76.*Pecten incertus* Tenison Woods, 1867. Proc. Phil. Soc. Adel. for 1865, (2), p. 1, pl. 1, fig. 1.*Pecten polymorphoides* Zittel. Tate, 1886. Trans. Roy. Soc. S. Aust., 8, p. 113, pl. 8, fig. 2.*Pecten polymorphoides* Zittel. Tate and Dennant, 1893. id., 17, (1), p. 224.*Pecten polymorphoides* Zittel. Harris, 1897. Cat. Tert. Moll. Brit. Mus., 1, p. 316.*Pecten polymorphoides* Zittel. Dennant and Kitson 1903. Rec. Geol. Surv. Vict., 1, (2), p. 120.**Diagnosis**—Inequivalve, left almost flat; valves with 5-7 broad folds with numerous bifurcating radiating ridges crossed by fine waving evenly spaced scales.**Dimensions**—Length 44, height 40, inflation (both valves) 16 mm.**Type Locality**—? River Murray Cliffs; ? Lower Miocene.**Location of Holotype**—Not known at present.**Observations**—This is a very variable species not previously recorded from the Adelaide Pliocene. Four right and two left valves were obtained from Weymouth's Bore. The fossil species resembles *C. (M.) caroli* Iredale from New South Wales more closely than the South Australian species *C. (M.) triggi*, Cotton and Godfrey. It is easily distinguished by its almost flat left valve, its 5-7 broad folds with their numerous ribs crossed by fine waving, evenly spaced scales.**Material**—Six valves, Weymouth's Bore, 310-330 feet; 2 valves Bairnsdale L. 341. 1 valve Muddy Creek L. 4815 B.M. Coll.**Stratigraphical Range**—Lower Miocene to Pliocene.**Geographical Distribution**—Port Phillip Bay, Victoria — Adelaide, South Australia.**GENUS LENTIPECTEN Marwick, 1928***Lentipecten* Marwick, 1928. Trans. N.Z. Inst., 58, p. 455.Type species (o.d.) *Pecten hochstetteri* Zittel***Lentipecten adelaidensis* sp. nov.**

pl. 1, fig. 13 a, b, c

Amusium hochstetteri Zittel. N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 150.**Diagnosis**—Thin and fragile, compressed, both valves smooth except for fine microscopic growth striae externally, apical angle 105° increasing to 120° . Ears subequal, anterior ear rayed, separated from valve by byssal notch and somewhat scaly; posterior ear broad, obtuse, smooth.**Description**—Right valve, juvenile. Shell of moderate size, thin, fragile, smooth except for growth striae; equilateral except for ears, somewhat higher than long. Apical angle 105° . Dorsal margin slightly concave, Ears unequal, broken in the holotype, dorsal margin slightly oblique upwards, posterior ear smooth, anterior ear rayed with five weak rays, somewhat scaly or roughened from incremental ridges, with a byssal notch which does not form a radial ridge. Hinge margin narrow internally, intersected by resiliary pit. No ctenolium. Shell smooth internally, muscular impression sub-circular.**Dimensions**—Length 11.3, height 12, inflation (one valve) 1 mm.**Paratypes**—Hinge portion of right and left valves of adults, with ears nearly complete. The posterior ear of the right valve is of moderate length, slightly oblique on the dorsal edge, then rounded towards the posterior extremity with which it makes an angle of about 120° . Anterior ear somewhat roughened and scaly, with fairly deep byssal notch. Apical angle about 120° . Both ears of the left valve are smooth and apparently subequal. Estimated dimensions of the adult shell are length and height about 30 mm.**Type Locality**—Abattoirs Bore, Adelaide; Pliocene.**Location of Holotype and Paratypes**—Tate Mus. Coll., Univ. of Adelaide. F 15121.

Observations—The several species previously known as *Pecten hochstetteri* have had a very chequered history in both Australia and New Zealand. The history of the synonymy of the New Zealand Miocene *hochstetteri* has been clearly explained by Marwick (1928, p. 450), and in the same publication (p. 455) the genus *Lentipecten* is raised and described. *P. hochstetteri* Zittel, as delimited by Hutton being cited as type species. *Pseudamussium huttoni* Park is a synonym of *hochstetteri*, Park having overlooked Hutton's delimitation, and the ribbed form figured by Zittel (1864, pl. 11, fig. 5b) is *Serripecten polemicus* Marwick (1928, p. 451). *Lentipecten parki* Marwick from the New Zealand Eocene is closely related.

The Australian species, with exception of an early erroneous identification by Tenison Woods (1876, p. 2, pl. 1, fig. 5) as *Pecten pleuronectes* Gmelin, has, until recently, also been known as *P. hochstetteri*. Tate (1886, p. 114) compared Australian with New Zealand examples, redescribed the smooth species, and "with certainty" announced the identity of the Australian shells with the New Zealand *hochstetteri*. Marwick (1924b, p. 320) stated on erroneous grounds following Park and at that time rejecting Hutton and Tate, that the Australian species was not *hochstetteri* because it had two smooth valves, but that only careful comparison of a number of specimens would determine whether the Australian species were *P. huttoni* (i.e., *Lentipecten hochstetteri* in the correct sense) or not. This error has recently been revived by Crespin (1950, p. 151), who has evidently overlooked Marwick's later references to *hochstetteri* and has separated the Australian "Janjukian" shell from *hochstetteri* on the grounds that it has two smooth valves. There is little doubt that the Australian species *victoriensis* Crespin is distinct, although not for the reason given. Although *victoriensis* is identical in general appearance with *hochstetteri*, it has differently shaped ears; in the left valve of *hochstetteri* the ears have a straight horizontal dorsal margin; in *victoriensis* the margin is oblique to convex upwards and the margin is serrated as in the right valve of *L. parki* Marwick. The byssal notch in the anterior ear of the right valve seems stronger in *hochstetteri*. *L. hochstetteri* is equivalve, while in *victoriensis* the right valve is gently convex, the left almost flat.

The present species *adelaidensis*, also previously identified as *hochstetteri* and still known mostly from fragmentary material, is distinguishable from *victoriensis* by its lower apical angle (120° as against 130° in *victoriensis*), and by the ears. The ears are relatively large in *adelaidensis* and straight dorsally, while the discrepant ornament on the ears is diagnostic.

Material—Holotype, 2 paratypes (incomplete valves), 2 portions of paratypes, Abattoirs Bore, Adelaide. 1 fragment Tennant's Bore.

Stratigraphical Range—Dry Creek Sands.

Geographical Distribution—Adelaide District.

Genus PROPEAMUSSIUM de Gregorio, 1884

Propeamussium de Gregorio, 1884. Natural. Sicil, 3, p. 119.

(*Ctenamussium* Iredale, 1929b. Rec. Aust. Mus., 17, (4), p. 164.)

Type species (monotypy) *Pecten (Propeamussium) ceciliae* de Gregorio.

Propeamussium atkinsoni (Johnston)

Amussium atkinsoni Johnston, 1880. Proc. Roy. Soc. Tas. for 1879, p. 41.

Pecten Zitteli Hutton. Tate, 1886. Trans. Roy. Soc. S. Aust., 8, p. 115, pl. 7, fig. 3 a-c.

Amussium atkinsoni Johnston, 1888. Geol. Tas., pl. 31, fig. 15, 15 a.

Pecten zitteli Hutton. Tate and Dennant, 1893. Trans. Roy. Soc. S. Aust., 17, (1), p. 224.

Amussium zitteli Hutton. Tate and Dennant, 1895. Id., 19, (1), p. 112.

Amussium zitteli Hutton (sp.). Harris, 1897. Cat. Tert. Moll., Brit. Mus., 1, p. 324.

Amussium zitteli Hutton. Tate, 1899. Trans. Roy. Soc. S. Aust., 23, (2), p. 272.

Amussium zitteli Hutton. Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 120.

Amussium atkinsoni Johnston. Marwick, 1924. Rep. Aust. Ass. Adv. Sci., 16, p. 318.

Propeamussium atkinsoni (Johnston). Chapman and Singleton, 1927. Proc. Roy. Soc. Vict., 39, (n.s.), p. 117.

Ctenamussium atkinsoni (Johnston). Cotton, 1947. Rec. S. Aust. Mus., 8, (4), p. 660-1.

Diagnosis—Very small, equivalve, interior of valves concave, shining, with nine to eleven ribs which terminate truncately near the margin. Exterior of right valve with varying reticulate sculptures, left valve concentrically striated.

Dimensions—Length 4, height 4 mm.

Type Locality—Table Cape, Tasmania.

Location of Holotype—? Hobart Museum.

Observations—This species was recorded for the first time from the Adelaide Pliocene at 330 feet in the Salisbury Bore by Cotton, 1947.

Material—20 valves, Muddy Creek, L 9876, B.M. Coll.

Stratigraphical Range—? Oligocene to Pliocene.

Geographical Distribution—Gippsland, Victoria — Adelaide, South Australia.

Genus HINNITES DeFrance, 1821

Hinnites DeFrance, 1821. Dict. Sic. Nat., 21, p. 169.

Type species (s.d. Blainville, 1825) *Hinnites cortesyi*

DeFrance = *Ostrea crispa* Brocchi

Hinnites corioensis McCoy

Hinnites corioensis McCoy, 1879. Prod. pal. Vict., 6, p. 31, pl. 58, fig. 1-5 a.

Hinnites corioensis McCoy, Tate, 1886 a. Trans. Roy. Soc. S. Aust., 8, p. 116.

Pecten deformis Tate 1887 b. id., 9, pl. 18, fig. 4.

Hinnites corioensis McCoy, Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 120.

Hinnites corioensis McCoy, N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 150.

Hinnites corioensis McCoy, Crespin, 1950. Proc. Roy. Soc. Vict., 60, p. 152, pl. 15, fig. 13.

Diagnosis—Young stage regular, ovate, with valves ornamented with intercalating ridges; adult stages irregular, upper or left valve flatter than right valve.

Dimensions—Length of large specimen 3.5 inches, height 3.5, inflation 1 to 2 inches.

Type Locality—Corio Bay, Victoria.

Location of Holotype—Vict. Mines Dept. Coll.

Material—Six fragments, Abattoirs Bore.

Stratigraphical Range—Lower Miocene to Pliocene.

Geographical Distribution—Gippsland, Victoria — Adelaide, South Australia.

Family SPONDYLIDAE

Genus SPONDYLUS Linné, 1758

Spondylus Linné, 1758. Syst. Nat., 1, ed. 10, p. 690.

Type species (s.d. Fleming, 1818) *Spondylus gaederopus* Linné

Spondylus spondyloides (Tate)

pl. 2, fig. 1

Pecten spondyloides Tate, 1882. Trans. Roy. Soc. S. Aust., 5, p. 44.

Pecten spondyloides Tate, 1886. id., 8, p. 112, pl. 4, fig. 6, non fig. 7.

Spondylus aldingensis Tate, 1896. Trans. Roy. Soc. S. Aust., 20, (1), p. 121.

Spondylus arenicola Tate, 1896. Rep. Aust. Ass. Adv. Sci., 6, p. 318 (nom. mul.).

Spondylus arenicola Tate, 1899. Trans. Roy. Soc. S. Aust., 23, (2), p. 275.

Spondylus arenicola Tate, Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 138, 145.

Spondylus arenicola Tate, N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 150.

Spondylus spondyloides Tate, Cotton, 1947. Rec. S. Aust. Mus., 3, (4), p. 655.

Diagnosis—Shell equilateral, inflated, with seven to nine primary ribs, between each pair of which there are two or three secondary and a variable number of tertiary ribs, all more or less spiny.

Dimensions—Length 44, height 44, inflation (both valves) 34 mm.

Type Locality—Aldinga Bay, South Australia; Pliocene.

Location of Syntypes—Tate Mus. Coll., Univ. of Adelaide. T956, T948 A-D.

Observations—Although Tate (1896, 1899) changed the specific name on account of its inappropriateness with the transfer to the genus *Spondylus*, the original *spondyloides*, in accordance with the International Rules of Zoological Nomenclature, must stand.

Material—One valve, Weymouth's Bore.

Stratigraphical Range—Dry Creek Sands.

Geographical Distribution—Adelaide, South Australia.

Family LIMIDAE

Genus LIMA Cuvier, 1798

Lima Cuvier, 1798. Tabl. Elem. Hist. Nat. Anim., p. 421.

Type species (tautonymy) *Ostrea lima* Linné

Lima bassi Tenison Woods

Lima bassi Tenison Woods, 1877. Pap. Roy. Soc. Tas. for 1876, p. 112.

Lima bassi Tenison Woods. Tate, 1886. Trans. Roy. Soc. S. Aust., 8, p. 117, pl. 5, fig. 8; pl. 8, fig. 1.

Lima bassi Tenison Woods. Tate and Dennant, 1893. id. 17, (1), p. 224.

Lima bassi Tenison Woods. Tate and Dennant, 1895. id. 19, (1), p. 112.

Lima bassi Tenison Woods, Pritchard, 1896. Proc. Roy. Soc. Vict., 8, (n.s.), p. 128.

Lima bassi Tenison Woods. Harris 1897. Cat. Tert. Moll. Brit. Mus., p. 130.

Lima bassi Tenison Woods. Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 119, 145.

Austrolima bassi Tenison Woods. N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 151.

Lima bassi Tenison Woods. Crespin, 1943. Min. Res. Surv. Bull., 9, p. 93.

Diagnosis—Obliquely subovate, rayed with about 25 imbricately squamose ribs.

Dimensions—Length 22, height 27 mm.

Type Locality—Table Cape, Tasmania.

Location of Holotype—Hobart Museum, Tasmania.

Observations—*Lima bassi* belongs to *Lima* s.str. It is not here intended to investigate Recent species beyond their bearing on the present fauna, but the following comments are offered upon the genera into which South Australian members of the family have been placed (Cotton and Godfrey, 1938, pp. 104-109). *Austrolima* Iredale, 1929, is not separable from *Lima* in the generic sense (see also Thiele, 1935, p. 811), while *Mantellum* (type species, designated by Gray, *Ostrea lima* is a direct synonym of *Lima* (see also Winckworth 1930, p. 116).

Material—Eleven specimens, Lower Beds, Muddy Creek, L4820, L9840, B.M. Coll. 1 valve, Table Cape, writer's collection.

Stratigraphical Range—? Oligocene to Pliocene.

Geographical Distribution—Gippsland, Victoria — Adelaide, South Australia.

Superfamily ANOMIACEA

Family ANOMIIDAE

Genus ANOMIA Linné, 1758

Anomia Linné, 1758. Syst. Nat., 1, ed. 10, p. 700.

Type species (s.d. Children, 1823) *Anomia ephippium* Linné

Anomia tatei Chapman and Singleton

pl. 4, fig. 11

Placunanomia ione Gray. Tate, 1890 a. Trans. Roy. Soc. S. Aust., 13, (2), p. 175.

Placunanomia ione Gray. Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 145.

Anomia tatei Chapman and Singleton, in Chapman, Crespin, and Keble, 1928, id. 5, (1), p. 99, pl. 11, fig. 76 a, b.

Momia ione Gray. N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 150.

Anomia tatei Chapman and Singleton. Crespin, 1943. Min. Res. Surv. Bull., 9, p. 92.

Momia tatei Chapman and Singleton. Cotton, 1947. Rec. S. Aust. Mus., 8, (4), p. 654.

Diagnosis—Surface unevenly convex with depressed radial threads narrower than the interspaces, crossing concentric undulose growth lines. Irregular ovate muscle scar beneath anterior end of chondrophore; large subcentral area with three muscle scars.

Dimensions—Probable length of shell when complete 60, height 50, inflation (one valve) 10 mm. Dimensions of muscular impressions, length 18, height 26 mm.

Type Locality—Grange Burn, near Hamilton, Victoria; Pliocene.

Location of Holotype—Geol. Surv. of Vict. Coll.

Observations—Cotton has listed this species with the statement "Recorded as *Placunanomia ione* Gray". It is not clear whether this is intended to apply only to Adelaide specimens or to those recorded from numerous localities and listed by Dennant and Kitson (1903, pp. 118, 138, 145).

Material—The figures hypotype and 34 other specimens, Abattoirs Bore. One valve, juvenile, Weymouth's Bore.

Stratigraphical Range—Pliocene.

Geographical Distribution—Gippsland, Victoria — Adelaide, South Australia.

Suborder **DYSODONTA**

Superfamily **MYTILACEA**

Family **MYTILIDAE**

Genus **BRACHIDONTES** Swainson, 1840

Brachidontes Swainson, 1840. Treat. Malac., p. 384.

(*Brachyodontes* Agassiz, 1846. Nom. Zool. Ind. Univ., p. 51.)

Type species (o.d.) *Modiola sulcata* Lamarck

Brachidontes hirsutus (Lamarck)

pl. 4, fig. 15

Mytilus hirsutus Lamarck, 1819. Hist. Nat. Anim. s. Vert., 6, (1), p. 120.

Trichomya hirsuta Lamarck. N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 150.

Diagnosis—Strongly curved, ornamented with fine, close, bifurcating riblets.

Dimensions—Height 60, width 26 mm.

Type Locality—"New Holland"; Recent.

Location of Holotype—Mus. Hist. Nat., Paris.

Material—Holotype; the figured hypotype and one other valve, Abattoirs Bore.

Stratigraphical Range—Dry Creek Sands and Recent.

Geographical Distribution—New South Wales to Great Australian Bight.

Order **ANOMALODESMACEA**

Superfamily **LATERNULACEA**

Family **MYOCIAMIDAE**

Genus **MYADORA** Gray, 1840

Myadora Gray, 1840. Ann. and Mag. Nat. Hist., 25, p. 306.

(*Myadora* Gray, 1840. Syn. Cont. Brit. Mus., ed. 42, p. 150.)

Type species (monotypy) *Pandora brevis* Sowerby

Myadora alea Cotton

Myadora ovata Reeve. N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 150.

Myadora alea Cotton, 1947. Rec. S. Aust. Mus., 8, (4), p. 665, pl. 20, fig. 20, 21, 22.

Diagnosis—Subovate, sculptured with about 36 concentric ribs in 11.5 mm., left valve smaller, less strongly sculptured.

Dimensions—Length 19, height 15 mm.

Type Locality—Salisbury Bore, 330 feet, South Australia; Pliocene.

Location of Holotype—Tate Mus. Coll., Univ. of Adelaide. T1728.

Observations—This species is very close indeed to the Indo-Pacific *M. ovata* Reeve. The only diagnostic difference lies in the number of concentric ribs which are 30 in *ovata* and 36 in *alea* (30 according to Cotton's description). The posterior hinge is slightly more curved in *alea*. *M. ovata* is thinner and the external ribs tend to be more conspicuously shown on the interior of the shell.

Material—Two valves, Abattoirs Bore.

Stratigraphical Range—Dry Creek Sands.

Geographical Distribution—Salisbury and Abattoirs Bores, South Australia.

Myadora tenuilirata Tate

- Myadora tenuilirata* Tate, 1887 b. Trans. Roy. Soc. S. Aust., 9, p. 174, pl. 17, fig. 9 a-b.
Myadora tenuilirata Tate and Dennant, 1893. Trans. Roy. Soc., S. Aust., 17, (1), p. 225.
Myadora tenuilirata Tate. Harris, 1897. Cat. Tert. Moll. Brit., Mus., (1), p. 390.
Myadora tenuilirata Tate. Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 127, 139.
Myadora tenuilirata Tate. N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 150.

Diagnosis—Elongate-oblong, left valve flat, ornamented with close-set fine, concentric ridges crossed by waving radial threads.

Dimensions—Length 16, height 10, inflation (both valves) 3 mm.

Type Locality—Lower Beds, Muddy Creek, Hamilton, Victoria; Miocene.

Location of Holotype—Tate Mus. Coll., Univ. of Adelaide, T1197.

Material—Three valves, topotypes. L9910, B.M. Coll.

Stratigraphical Range—Lower Miocene to Pliocene.

Geographical Distribution—Gippsland, Victoria—Adelaide, South Australia.

Myadora corrugata Tate

pl. 1, fig. 17

- Myadora corrugata* Tate, 1887 b. Trans. Roy. Soc. S. Aust., 9, p. 175, pl. 17, fig. 11 a-b.
Myadora corrugata Tate. Harris, 1897. Cat. Tert. Moll. Brit. Mus., 1, p. 391.
Myadora corrugata Tate. Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2) p. 139.
Myadora corrugata Tate. N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 150.
Myadora corrugata Tate. Cotton, 1947. Rec. S. Aust. Mus., 8, (4), p. 655.

Diagnosis—Triangularly ovate, with about 20 distant concentric ridges. Left valve flat.

Dimensions—Length 18, height 14.5, inflation (both valves) 4 mm.

Type Locality—Upper beds, Muddy Creek, Hamilton, Victoria; Pliocene.

Location of Holotype—Tate Mus. Coll., Univ of Adelaide, T1192.

Material—Five valves, topotypes L4809, L9911, B.M. Coll., 2 whole valves, 2 portions, Weymouth's Bore.

Stratigraphical Range—Pliocene.

Geographical Distribution—Gippsland, Victoria—Adelaide, South Australia.

Section ADELLOSIPHONIA

Family PANDORIDAE

Genus CLEIDOTHAERUS Stutchbury, 1830

Cleidothaerus Stutchbury, 1830. Zool. Journ., 5, (17), p. 97.

Type species (monotypy) *Aspergillum strangei* Adams

Humphreyia strangei (Adams)

- Aspergillum strangei* Adams, 1852. Proc. Zool. Soc. Lond., 20, p. 91, pl. 15, fig. 5.
Humphreyia strangei Adams. Tate, 1890. Trans. Roy. Soc. S. Aust. for 1889/90, 13, p. 174.
Humphreyia strangei Adams. Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 147.
Humphreyia strangei Adams and Angas. N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 150.

Diagnosis—Tube squarely rounded, obtusely keeled; valves squarely ovate.

Material—Holotype, B.M. Coll.; portion of sheath, Abattoirs Bore.

Stratigraphical Range—Dry Creek Sands and Recent.

Geographical Distribution—New South Wales to Hardwicke Bay, South Australia.

Humphreyia incerta (Chenu)

Aspergillum incertum Chenu, 1842. Illust. Conchyl. 1, *Aspergillum*, p. 4, pl. 4, fig. 5, 5a, 6, 6a.

Diagnosis—Tube short, rounded, variously agglomerated, disc perforated by several apertures with tubes up to 4 mm. in length.

Type Locality—Swan River, Western Australia; Recent.

Location of Holotype—British Museum (Natural History).

Material—Holotype, B.M. Coll., Portions of disc, Abattoirs Bore, Adelaide.
Stratigraphical Range—Dry Creek Sands and Recent.
Geographical Distribution—South Australia.

Family CUSPIDARIIDAE

Genus CUSPIDARIA Nardo, 1840

Cuspidaria Nardo, 1840. Atti. R. Acc. Sci. Ital., 1, p. 175.

(*Neaera* Gray, 1839. 8th Rep. Brit. Ass. (Newcastle) non Robineau-Desvoidy, 1830.)

Type species (monotypy) *Tellina cuspidata* Olivi

Cuspidaria subrostrata Tate

Neaera subrostrata Tate, 1887 b. Trans. Roy. Soc. S. Aust., 9, p. 177, pl. 15, fig. 2 a-b.

Cuspidaria subrostrata Tate (sp.) Harris, 1897. Cat. Tert. Moll. Brit. Mus., (1), p. 389.

Cuspidaria subrostrata Tate, Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 127.

Cuspidaria subrostrata Tate, N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 150.

Diagnosis—Moderately convex, anterior dorsal margin slightly convex and sloping, posterior dorsal portion longer, less oblique, moderately concave. Ornamented with coarse concentric growth lines becoming lamellose at umbo and rostral insinuation.

Dimensions—Length 18, height 9, inflation (one valve) 3.5 mm.

Type Locality—Muddy Creek, Hamilton, Victoria; Lower Miocene.

Location of Holotype—Tate Mus. Coll., Univ. of Adelaide.

Material—Three topotypes, Muddy Creek, L4810, L9845, B.M. Coll. 4 fragments Abattoirs Bore.

Stratigraphical Range—Lower Miocene to Pliocene.

Geographical Distribution—Gippsland, Victoria — Adelaide, South Australia.

Order TELEODESMACEA

Suborder DIOGENODONTA

Superfamily ASTARTACEA

Family CRASSATELLIDAE

Genus EUCRASSATELLA Iredale, 1924

Eucrassatella Iredale, 1924. Proc. Linn. Soc. N.S.W., 49, (3), 197, p. 203.

Type species (o.d.) *Crassatella kingicola* Lamarck

Eucrassatella camura (Pritchard)

pl. 5, fig. 4

Crassatella oblonga T. Woods. Tate, 1890. Trans. Roy. Soc. S. Aust., 13, p. 175.

Crassatellites oblonga T. Woods. Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 146.

Crassatellites camurus Pritchard, 1903. Proc. Roy. Soc. Vict., 15, (2), p. 96, pl. 14, fig. 5, 9.

Crassatellites oblonga T. Woods, N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 151.

Eucrassatella camura (Pritchard). Coiton, 1947. Rec. S. Aust. Mus., 8, (4), p. 662.

Diagnosis—Size medium, anterior very short, posterior attenuated, umbo strong, broad, medially depressed. Slightly to deeply concave posterior to beaks, ventral margin very slightly convex, medial portion usually straight.

Dimensions—Left valve length 54, height 41, inflation (one valve) 14 mm. Right valve length 55, height 37, inflation (one valve) 12 mm.

Type Locality—Grange Burn, Victoria; Pliocene.

Location of Syntypes—Melb. Univ. Geol. Dept., Nos. 1761-1766.

Material—Numerous valves, Hindmarsh Bore, 1 broken specimen Weymouth's Bore, 1 valve, Kooyonga Bore; 8 valves upper beds Muddy Creek, L4834, L6601, L9851, B.M. Coll.

Stratigraphical Range—Pliocene.

Geographical Distribution—Gippsland, Victoria — Adelaide, South Australia.

Eucrassatella kingicoloides (Pritchard)

pl. 5, fig. 6

Crassatellites kingicoloides Pritchard 1903. Proc. Roy. Soc. Vict., 15, (2), p. 94, pl. 13, fig. 1, 2, 3.*Eucrassatella kingicoloides* (Pritchard). Singleton, 1945. Proc. Roy. Soc. Vict., 56, (2), (n.s.), p. 257, 258.*Eucrassatella kingicoloides* (Pritchard), Crespin, 1950, id. 60, (n.s.), p. 153, pl. 14, fig. 6 (*lapsus calami* for *kingicoloides*).*Diagnosis*—Broadly ovate, rather inflated near umbos but becoming depressed ventrally and posteriorly. Posterior dorsal margin deeply concave to a short straight posterior truncation. Ventral margin regularly convex. Umbos strong and tumid. Shell shallow internally.*Dimensions*—Length 69, height 54 inflation (both valves) 36 mm.*Type Locality*—Jemmy's Point, Kalimna, Victoria; Lower Pliocene.*Location of Holotype*—Melb. Univ. Geol. Dept., No. 1756.*Observations*—The two species of *Eucrassatella* listed above were originally classified as *E. oblonga*.Cotton (1947, p. 662) has observed that the Adelaide species is not quite like *E. oblonga* nor quite like *E. camura* and figures a specimen approximating more closely to *camura*. Specimens from Hindmarsh Bore are *E. camura*, while those from Kooyonga Bore include both *camura* and *kingicoloides*. In the British Museum a tablet of specimens identified as *C. oblonga* from Muddy Creek, contains four examples each of what were later described as *kingicoloides* and *camura* respectively. Both species occur together at Jemmy's Point and in the Dry Creek Sands.*Material*—One complete left valve, 3 portions, Kooyonga Bore.*Stratigraphical Range*—Pliocene.*Geographical Distribution*—Gippsland, Victoria — Adelaide, South Australia.Genus *CUNA* Hedley, 1902*Cuna* Hedley, 1902. Mem. 4 Aust. Mus., p. 314.Type species (o.d.) *Cuna concentrica* Hedley***Cuna polita*** (Tate)

pl. 1, fig. 15

Carditella polita Tate, 1887 b. Trans. Roy. Soc. S. Aust., 9, p. 158, pl. 20, fig. 20, 21.*Carditella polita* Tate. Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 124, 139.*Cuna polita* Tate. N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 151.*Diagnosis*—Trigonal, slightly inequilateral, inner ventral margin crenulate.*Dimensions*—Length 2.5, height 2.5 mm.*Type Locality*—Muddy Creek, Hamilton, Victoria; ? Miocene.*Location of Holotype*—Tate Mus. Coll., Univ. of Adelaide.*Material*—Three valves, Hindmarsh Bore.*Stratigraphical Range*—Miocene and Pliocene.*Geographical Distribution*—Gippsland, Victoria — Adelaide, South Australia.***Cuna aporema*** Cotton*Cuna aporema* Cotton, 1947. Rec. S. Aust. Mus., 8, (4), p. 662.*Diagnosis*—Subtrigonal, higher than long, smooth except for growth striae, inner ventral margin without crenulations.*Dimensions*—Length 4.25, height 5 mm.*Type Locality*—Bore 41, 405 feet - 407 feet; Pliocene.*Location of Holotype*—S. Aust. Mus., P8407.*Material*—One specimen, Tennant's Bore.*Stratigraphical Range*—Dry Creek Sands.*Geographical Distribution*—Adelaide Plains.

Superfamily CARDITACEA

Family CARDITIDAE

Genus CARDITA Bruguière, 1792

Cardita Bruguière, 1792, Ency. Meth. Vers. (1), p. 401.

Type species (s.d. Fleming, 1818) *Cardita variegata* Bruguière.

***Cardita compta* (Tate)**

pl. 2, fig. 2

Mytilicardia compta Tate, 1886, Trans. Roy. Soc. S. Aust., 3, p. 149, pl. 12, fig. 2.

Mytilicardia compta Tate, Dennant and Kitson, 1903, Rec. Geol. Surv. Vict., 1, (2), p. 123, 138.

Cardita compta Tate, N. H. Woods, 1931, Trans. Roy. Soc. S. Aust., 55, p. 151.

Cardita compta (Tate), Cotton, 1947, Rec. S. Aust. Mus., 8, (4), p. 654.

Diagnosis—Posterior side narrow; 15 narrow scaly ribs consisting of 7 anterior ribs, 4 primary ribs, then 2 narrow posterior ribs followed by 2 compressed elevated ribs.

Dimensions—Length 29, greatest height 17, height at umbo 12 mm.

Type Locality—Muddy Creek, Hamilton, Victoria; Pliocene.

Location of Holotype—Tate Mus. Coll., Univ. of Adelaide.

Material—Four valves. Weymouth's Bore, 2 valves, Abattoirs Bore.

Stratigraphical Range—"Cheltenhamian" to Dry Creek Sands.

Geographical Distribution—Gippsland, Victoria — Adelaide, South Australia.

***Cardita subdeceptiva* sp. nov.**

pl. 4, fig. 14

Cardita preissi Menke, Tate, 1890 a, Trans. Roy. Soc. S. Aust., 13, p. 175.

Cardita preissi Menke, Dennant and Kitson, 1903, Rec. Geol. Surv. Vict., 1, (2), p. 146.

Cardita preissi Menke, N. H. Woods, 1931, Trans. Roy. Soc. S. Aust., 55, p. 151.

Cardita compta Tate, Cotton 1947, Rec. S. Aust. Mus., 8, (4), p. 663.

Diagnosis—A fairly large *Cardita* rectangularly ovate, moderately convex, with 14 radial costae, 3 on the depressed posterior area, followed by 4 larger and approximately equal costae, then 7 costae gradually descending in size towards the anterior border. Interspaces wide, deep with steep sides; on the anterior portion the ribs are more or less nodulose, but the nodules fade out on the fifth rib from the posterior border. Ribs and interspaces crossed by frequent concentric growth lamellae.

Description of Holotype—Shell rectangularly ovate, solid, fairly thick, umbones slightly convex incurved, prosogyrate, situated at about one-sixteenth from the anterior border. Posterior margin elongate, posterior side somewhat expanded towards the ventral border but flattened in a long triangular area below the dorsal margin. Surface sculptured with 14 axial costae, of which there are 3 narrow costae in the depressed posterior area, followed by 4 larger approximately equal costae in the umbo-post-ventral area, then 7 gradually decreasing in size towards the anterior margin. Interspaces deep, wide, with steep sides; ribs more or less nodulose in the anterior portion, but nodules gradually becoming obsolete on about the fifth rib from the posterior border; ribs and interspaces crossed by frequent, crowded, concentric growth striae.

Inner margin of shell coarsely crenulate in conformity with the external ribs, hinge oblique to the ventral margin, damaged in the holotype.

Dimensions—Length 32, height 24, inflation (one valve) 12 mm.

Type Locality—Dry Creek Bore, Adelaide District; Pliocene.

Location of Holotype—Tate Mus. Coll., Univ. of Adelaide, F 15122.

Observations—This species very closely resembles *Cardita incrassata* Sowerby (= *C. preissi* Menke) with which it was formerly identified. However, *C. incrassata* has 16 radial costae wider than the interspaces which are narrower than those of *C. subdeceptiva*. *C. subdeceptiva* is broader than *C. incrassata*. It has fewer

costae than the Jemmy's Point species *C. kalimnae* (Pritchard) with 19 ribs of which the posterior are scaly.

Material—Holotype and five paratypes, Dry Creek Bore.

Stratigraphical Range—Dry Creek Sands.

Geographical Distribution—Dry Creek, Croydon, and Abattoirs Bores, South Australia.

Genus GLANS Megerle, 1811

Glans Megerle, 1811. Ges. Nat. Fr. Berlin. Mag. 5, (1), p. 68.

Type species (monotypy) *Glans trapezia* = *Venus trapezia* Linné

Glans spinulosa (Tate)

pl. 4, fig. 1

Cardita spinulosa Tate, 1886. Trans. Roy. Soc. S. Aust., 8, p. 153, pl. 2, fig. 3.

Cardita spinulosa Tate. Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 123, 139.

Venericardia spinulosa Tate. N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 151.

Diagnosis—A rotund-cordate *Glans* with high, tumid umbo; sculptured with 22 prominent, narrow, spinose ribs.

Dimensions—Length 33, height 31, length of anterior side 9, inflation (both valves) 36 mm.

Type Locality—Blue clays, Schnapper Point, Victoria.

Location of Holotype—Tate Mus. Coll., Univ. of Adelaide.

Observations—The hinge of *spinulosa* is that of *Glans*. The figured hypotype has the prominent laterally compressed costae of typical *spinulosa*, but the spinose character disappears ventrally and the costae become lamellose. This, according to Chapman and Crespin (1933, p. 68) is the principal diagnostic feature of their variety *dennanti* described below as a separate species. In Adelaide specimens at least the degree of platiness of the adult sculpture does not appear to be diagnostic of *spinulosa*, although in *dennanti* the ribs are always lamellose towards the margin. The two species are distinct in shape; *spinulosa* is more inflated, shorter, with more prominent and tumid umbo. The costae of *spinulosa* are very prominent and in the hypotype the interspaces, where they are not lamellose, are finely shagreened.

Material—Hypotype, Abattoirs Bore.

Stratigraphical Range—Lower Miocene to Pliocene.

Geographical Distribution—Gippsland, Victoria — Adelaide, South Australia.

Glans dennanti (Chapman and Crespin)

pl. 2, fig. 6

Venericardia spinulosa (Tate) var. *dennanti* Chapman and Crespin 1933. Trans. Roy. Soc. Vict., 46, (1), p. 68, pl. 5, fig. 5, 6.

Venericardia spinulosa var. *dennanti* Chapman and Crespin, 1943. Min. Res. Surv. Bull., 9, p. 94.

Diagnoses—A *Glans*, rectangularly ovate, not inflated, with 23 radial costae bearing imbricating, scarcely-elevated spines at regular intervals. Towards the ventral margin the spines are less regularly disposed and the ribs become lamellose. Anterior margin short and gently rounded, post dorsal margin oblique then descending at an angle of 120° before curving to the ventral border. Posterior area flattened.

Dimensions—Length 24, height 19.5, inflation (one valve) 8 mm.

Type Locality—(Holotype) Old Bunga-road, east of No. 1 bore, Lakes Entrance, East Gippsland, Victoria.

Location of Holotype—Commonwealth Collection, Canberra, No. 53.

Locality of Hypotype—Weymouth's Bore, Adelaide, 310-330 feet.

Location of Hypotype—S. Aust. Mines Dept. Coll.

Observations—Originally described as a variety of *spinulosa* this is a distinct species from *spinulosa*, from which it differs in shape, inflation and sculpture. The dentition is that of *Glans* s.str. (Chavan, 1941, p. 99); the right hinge determinable from a broken specimen only having a weak A I, a weak 3a, a very strong 3b and a weak P II.

Should the species described by Tate and Basedow, 1902, as *Cardita dennanti* prove also to be a *Glans*, Chapman and Crespin's species will need a new name. Pending examination of the hinge of "*Cardita*" *dennanti* to locate the species more accurately the name of the present species is not altered.

Material—The hypotype and 3 left valves, portion of 1 right valve, Weymouth's Bore, Adelaide.

Stratigraphical Range—Lower Miocene to Pliocene.

Geographical Distribution—Gippsland, Victoria — Adelaide, South Australia.

Genus *PLEUROMERIS* Conrad, 1867

Pleuromeris Conrad, 1867a. Amer. Jour. Conch., 3, p. 12.

Type species (monotypy) *Cardita tridentata* Conrad.

Pleuromeris subpecten sp. nov.

pl. 2, fig. 3

Diagnosis—A small *Pleuromeris*, triangularly ovate, somewhat depressed, with 17 radial costae, equal to interspaces, bearing numerous elongated oval granules.

Description of Holotype—Left valve. Shell triangularly ovate, moderately depressed but evenly convex. Umbo slightly elevated acute, at about two-fifths from anterior border, moderately incurved and prosogyrate. Sculpture of 17 sharply defined radial costae with straight sides, about equal to the interspaces bearing numerous (about 5 per mm.) elongate-oval granules crossing the whole of the rib and projecting over the interspaces.

Hinge fairly narrow, with a long F II, a long and well-developed 4b, a small but high 2 and a small A II, the pit between 4b and 2 is small and narrowly triangular. Margin of valve crenulate, corresponding to external ribs.

Dimensions—Length 5.3, height 4.8, inflation (one valve) 1.6 mm.

Type Locality—Weymouth's Bore 310'-330'.

Location of Holotype—Tate Mus. Coll. F 15123.

Paratype—Right valve. Like the holotype, hinge with A I weak, 3b prominent and triangular, with a broad base, P II small.

Dimensions—Length 5.2, height 4.7, inflation (one valve) 1.4 mm.

Observations—*Pleuromeris subpecten* differs from *P. pecten* principally in the number of radial costae, *subpecten* having 17, *pecten* 22. The posterior slope in *subpecten* is not flattened and the shell is evenly convex throughout.

Material—Holotype, paratype, 5 topotypes, Weymouth's Bore. 18 specimens Hindmarsh Bore.

Stratigraphical Range—Dry Creek Sands.

Geographical Distribution—Hindmarsh and Weymouth's Bores, Adelaide.

Pleuromeris pecten (Tate)

Cardita pecten Tate, 1886. Trans. Roy. Soc. S. Aust., 8, p. 151, pl. 2, fig. 11.

Cardita pecten Tate, Dennant and Kitson, 1903. Rec. Geol. Surv. Viet., 1, (2), p. 139.

Venericaria pecten Tate, N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 151.

Venericardia pecten Tate, Cotton, 1947. Rec. S. Aust. Mus., 8, (4), p. 654.

Diagnosis—A very small *Pleuromeris*, ovately triangular, depressed, with 22 compressed crenately granose ribs.

Original Description—Shell ovately triangular, transverse, rather depressed, regularly convex, except the flattened posterior slope; umbones small, acute,

antemedian, directed forwards; anterior margin of valves coarsely crenulated. Surface ornamented with 22 narrow, compressed, crenately-granose, radial ribs; interspaces flat, wider than the ribs.

Dimensions—Length 6.5, width 2, length from umbo to posterior angle 6.5, inflation (both valves) 3 mm.

Type Locality—Muddy Creek, Hamilton, Victoria; Pliocene.

Location of Holotype—Tate Mus. Coll., Univ. of Adelaide.

Material—Four valves Weymouth's Bore, 6 valves Hindmarsh Bore.

Stratigraphical Range—Pliocene.

Geographical Distribution—Muddy Creek, Victoria — Adelaide, South Australia.

Pleuromeris trigonalis (Tate)

pl. 2, fig. 4

Cardita trigonalis Tate, 1886, Trans. Roy. Soc. S. Aust., 8, p. 151, pl. 2, fig. 1.

Cardita trigonalis Tate, Dennant and Kitson, 1903, Rec. Geol. Surv. Vict., 1, (2), p. 123, 139.

Venericardia trigonalis Tate, Cotton, 1947, Rec. S. Aust. Mus., 8, (4), p. 655.

Diagnosis—Triangular, with 15 nodulose ribs.

Original Description—Shell triangular, moderately convex, umbones elevated, slightly oblique incurved, anterior posterior margin inclined, making with the slightly arched ventral margin a roundly acute angle; anterior side rounded; dorsally excavated. Surface ornamented with 15 crenately-nodulose, rounded, radiating ribs, the interspaces wider than the ribs with transverse thick lirae. Inner margin of valves coarsely crenulated.

Dimensions—Length 7, height 6.5 mm.

Type Locality—Blanche Point, Aldinga Bay; Pliocene.

Location of Holotype—Tate Mus. Coll., Univ. of Adelaide.

Material—Four valves, Weymouth's Bore.

Stratigraphical Range—(?) Miocene; Pliocene of South Australia.

Geographical Distribution—(?) Gippsland, Victoria — Adelaide, South Australia

Genus CYCLOCARDIA Conrad, 1867

Cyclocardia Conrad, 1867 b. Amer. Journ. Conch., 3, p. 191.

Type species (monotypy) *Cyclocardia borealis* Conrad

Subgenus SCALARICARDITA Sacco, 1899

Scalaricardita Sacco, 1899, Moll. Terr. Terz. Piem., 27, p. 22.

Type species (monotypy) *Venericardia scalaris* Sowerby

Cyclocardia (*Scalaricardita*) *subcompacta* Chapman and Crespin

pl. 2, fig. 5, 8

Venericardia subcompacta Chapman and Crespin, 1928, Rec. Geol. Surv. Vict., 5, (1), p. 102, pl. 5, fig. 21; pl. 11, fig. 80.

Venericardia subcompacta Chapman and Crespin, N. H. Woods, 1931, Trans. Roy. Soc. S. Aust., 55, p. 151.

Venericardia subcompacta Chapman and Crespin, Crespin, 1943, Min. Res. Surv. Bull., 9, p. 94.

Diagnosis—Subtriangular, about as high as long, with 25 ovately beaded ribs. In the juvenile the radial sculpture is obsolete in the umbonal area and the concentric striae are produced anteriorly.

Dimensions—Length 2.5, height 3.2 mm.

Type Locality—Sorrento Bore, Mornington Peninsula, 605 ft.; Lower Pliocene.

Location of Holotype—Geol. Surv. Vict. Coll.

Material—Two figured hypotypes and 23 valves, Weymouth's Bore.

Stratigraphical Range—"Mitchellian" to Dry Creek Sands.

Geographical Distribution—Gippsland, Victoria — Adelaide, South Australia.

Subgenus ARCTURELLINA Chavan, 1951

Arcturellina Chavan, 1951, Compt. rend. Soc. Geol., France, 12, p. 210.(*Arcturella* Chavan, 1941, Journ. de Conch., 84, (1), p. 100 *nom* Sars, 1897.)Type species (o.d.) *Venericardia asperula* Deshayes*Cyclocardia* (*Arcturellina*) *hindmarshensis* sp. nov.

pl. 2, fig. 9

Diagnosis—A small *Arcturellina*, inflated, subtrigonal, with 19 radial costae carrying in the earlier stages oval-shaped imbricating tubercles, and in the latter stages irregular imbricating growth lamellae crossing ribs and interspaces without interruption.

Description of Holotype—Right valve. Shell fairly small, thick solid, subtrigonal, inflated. Umbo subcentral, high, incurved, prosogyrate, smooth at tip. Sculpture of 19 radial costae, equal to the interspaces, bearing in the early stages oval tubercles almost completely crossing the costae and in the later stages irregular imbricating growth lamellae crossing ribs and interspaces without interruption. Lunule broad, cordate, smooth except for growth striae. Escutcheon long and smooth, well marked. Hinge very heavy, strongly curved; 3a well developed, 3b strong; P III damaged in holotype, otherwise high. Inner margin heavy, ctenulate.

Dimensions—Length 8.5, height 9, inflation (one valve) 3.5 mm.

Paratype—Left valve, of which hinge is figured. Dentition P II (weak), 4b and 2 strong and projecting, A II fairly high.

Type Locality—Hindmarsh Bore 450-487 feet; Pliocene.

Location of Holotype and Paratype—Tate Mus. Coll., Univ. of Adelaide. F 15124.

Observations—The species *hindmarshensis* is close to *C. (A.) gippslandica* (Chapman and Crespin). It is, however, a smaller shell with a different sculpture. The ribs in *gippslandica* are beaded in the early and intermediate stages and lamellose in the later stages. At no stage has *gippslandica* the imbricating oval tubercles of *hindmarshensis*.

The subgenus *Arcturellina* to which *hindmarshensis* and *peridonea*, below, belong is represented in the European Eocene and Paleocene by the species (all of Deshayes *asperula* (Lutetian) *aizensis* (Montian and Cuisian), *prevosti* (Cuisian), *pulchra* (Cuisian), *ambigua* (Lutetian) and *serrulata* (Lutetian). (Chavan 1941, p. 100). It is the Indo-Pacific subgenus of the otherwise typically American *Cyclocardia* and has apparently one survivor in "*Venericardia*" *bimaculata* Deshayes in Tasmania at the present day. (Chavan, 1949, p. 512).

Material—Holotype, paratype, and one topotype, Hindmarsh Bore, four specimens Weymouth's Bore.

Stratigraphical Range—Dry Creek Sands.

Geographical Distribution—Hindmarsh and Weymouth's Bores, Adelaide.

Cyclocardia (*Arcturellina*) *peridonea* sp. nov.

pl. 2, fig. 7

Diagnosis—Triangularly ovate, not inflated, small, fairly solid, with 18 ribs bearing imbricating scales.

Description of Holotype—Left valve. Shell small, fairly solid, triangularly ovate. Umbo moderately inflated, directed anteriorly, incurved, fairly prominent. Dorsal margin straight, and sloping posteriorly, somewhat excavate and then more steeply sloping anteriorly. Both posterior and anterior margins rounded; anterior narrower and slightly directed dorsally while posterior margin is rounded with a direction towards the ventral margin. Ventral margin deeply curved. Surface sculptured with 18 radiating ribs, a little broader than interspaces, covered with narrow imbricating scales which tend to become platy towards the

ventral margin. Interspaces flat with fine and thin lamellae approximately corresponding to the scales on the ribs. Internal ventral margin coarsely crenulated. Hinge with teeth 4b and 2 widely divergent. Lunule impressed, smooth, elongate-cordate.

Dimensions—Length 8.5, height 8.0, inflation (one valve) 2.8 mm.

Type Locality—Hindmarsh Bore, 450-487 feet; Pliocene.

Location of Holotype—Tate Mus. Coll., Univ. of Adelaide. F 15125.

Observations—*C. peridonea* is closest to *C. gippslandica*; it has fewer ribs, which are imbricate-scaly rather than tuberculate. The shell is smaller and less produced towards the umbo, which lacks the prominence of *gippslandica*.

Material—Holotype, paratype, 9 topotypes Hindmarsh Bore; 24 valves Weymouth's Bore.

Stratigraphical Range—Dry Creek Sands.

Geographical Distribution—Adelaide District.

Family CONDYLOCARDIIDAE

Genus CONDYLOCARDIA Bernard, 1897

Condylocardia Bernard, 1897. Journ. de Conch., 44, (3), p. 169.

Type species (o.d.) *Condylocardia sanctipauli* Bernard

Condylocardia tenuicostae Chapman and Gabriel

pl. 1, fig. 18, 19

Condylocardia tenuicostae Chapman and Gabriel, 1914. Proc. Roy. Soc. Vict., 26, (n.s.), (2), 309.

Condylocardia tenuicostae Chapman and Gabriel. Chapman, 1916. Rec. Geol. Surv. Vict., 3, (4), p. 388.

Condylocardia tenuicostae Chapman and Gabriel, Chapman, Crespin, and Keble. 1928. Rec. Geol. Surv. Vict., 5, (1), p. 156.

Condylocardia tenuicostae Chapman and Gabriel. Crespin, 1943. Min. Res. Surv. Bull., 9, p. 92.

Diagnosis—Broadly triangularly ovate, sculpture of about 36 narrow depressed riblets dying out in the umbonal area and crossed by concentric growth lines.

Dimensions—Holotype (left valve), length 2.15, height 1.77 mm.

Type Locality—Bore No. 10, 310-320 feet, Mallee Bores near Ouyen, north-west Victoria.

Location of Holotype—Geol. Surv. Vict. Coll.

Material—One valve, Hindmarsh Bore.

Stratigraphical Range—Miocene to Pliocene.

Geographical Distribution—Gippsland, Victoria — Adelaide, South Australia.

Superfamily ISOCARDIACEA

Family SPORTELLIDAE

Genus SPORTELLA Deshayes, 1858

Sportella Deshayes, 1858. Anim. s. Vert. Bassin de Paris, 1, p. 593.

Type species (c.d.) *Psammobia dubia* Defrance

Sportella jubata Hedley

pl. 1, fig. 20

Sportella jubata Hedley, 1909. Proc. Linn. Soc. N.S.W., 34, (3), p. 428, pl. 37, fig. 22-23.

Sportella jubata Hedley. N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 151.

Diagnosis—Subrhomboidal, longer than high, sculpture of fine, radiating threads increasing by intercalation. The lateral threads increase rapidly and diverge sharply at the umbo-post-ventral and antero-ventral angle and curve concavely towards the dorsal margin.

Dimensions—Length 8.5, height 6, inflation (one valve) 2 mm.

Type Locality—Hope Islands, North Queensland, 5-10 fathoms; Recent.

Location of Holotype—Australian Museum, Sydney.

Observations—The identification of this shell, described from North Queensland, is surprising. There are 14 specimens from the Hindmarsh Bore alone agreeing in all respects with the description of the type; dimensions of the average adult shell are the same as those of the type. One adult attained the following dimensions: Length 12, height 8.1, inflation (one valve) 2.5 mm.

Material—Fourteen valves Hindmarsh Bore, 2 valves Weymouth's Bore.

Stratigraphical Range—Dry Creek Sands and Recent.

Geographical Distribution—Adelaide District (Pliocene), North Queensland (Recent).

Superfamily CHAMACEA

Family CHAMIDAE

Genus CHAMA Linné, 1758

Chama Linné, 1758. Syst. Nat., 1, ed. 10, p. 691.

Type species (s.d. Fleming, 1818) *Chama lazarus* Linné

Chama lamellifera Tenison-Woods

Chama lamellifera Tenison-Woods. 1877. Proc. Roy. Soc. Tas. for 1876, p. 114.

Chama lamellifera Tenison-Woods. Tate, 1887 b. Trans. Roy. Soc. S. Aust., 9, p. 149, pl. 14, fig. 5 a-b.

Chama lamellifera Tenison-Woods Tate and Dennant, 1893. Trans. Roy. Soc. S. Aust., 17, (1), p. 224.

Chama lamellifera Tenison-Woods. Pritchard, 1897. Proc. Roy. Soc. Vict., 8, (n.s.), p. 133.

Chama lamellifera Tenison-Woods. Harris, 1897. Cat. Tert. Moll. Brit. Mus., 1, p. 369.

Chama lamellifera T. Woods. Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 125.

Chama lamellifera T. Woods. N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 151.

Diagnosis—Surface of both valves sculptured with distant, thin, irregular, sometimes projecting lamellae. Lamellae finely radiately ridged and striated; interspaces concentrically striated.

Dimensions—Length 24, height 22, inflation (both valves) 18 mm.

Type Locality—Table Cape, Tasmania.

Location of Holotype—Hobart Museum, Tasmania.

Material—Seven valves, Lower Beds, Muddy Creek, Victoria. B.M. Coll., 3 valves, Abattoirs Bore (? from pre-Pliocene strata).

Stratigraphical Range—Not definitely established.

Geographical Distribution—Gippsland, Victoria — Adelaide, South Australia.

Superfamily LUCINACEA

Family LUCINIDAE

Genus MYRTEA Turton, 1822

Myrtea Turton, 1822. Conch. Insul. Brit., p. 15, 133.

Type species (monotypy) *Venus spinifera* Montagu

Myrtea fabuloides (Tate)

pl. 2, fig. 16

Lucina fabuloides Tate, 1886. Trans. Roy. Soc. S. Aust., 8, pl. 12, fig. 5.

Lucina fabuloides Tate, 1887 b. *id.*, 9, p. 145.

Lucina fabuloides Tate. Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 126, 139, 147.

Lucina fabuloides Tate. N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 151.

Epicodakia fabuloides Tate. Cotton, 1947. Rec. S. Aust. Mus., 8, (4), p. 655.

Diagnosis—Oblong-ovate, compressed, surface with about 16 erect thin lamellae. Hinge with two small cardinal teeth in right valve, one cardinal and two distant laterals in left valve.

Dimensions—Length 9, height 7 mm.

Type Locality—Oyster beds, Blanche Point, Aldinga Bay; Pliocene.

Location of Holotype—Tate Mus. Coll., Univ. of Adelaide.

Observations—*M. fabuloides* is widely distributed in small numbers in the Dry Creek Sands. It is recorded in all bores under present consideration, from the Dry Creek Bore, and by Cotton (1947, p. 655).

Material—Three valves Weymouth's Bore, 3 valves Abattoirs Bore.

Stratigraphical Range—Pliocene.

Geographical Distribution—Murray River—Adelaide, South Australia.

Genus MONITILORA Iredale, 1930

Monitilora Iredale, 1930. Rec. Aust. Mus., 17, (9), p. 390.

Type species (o.d.) *Lucina ramsayi* Smith

Subgenus MONITILORA s.str.

***Monitilora (Monitilora) idonea* sp. nov.**

pl. 3, fig. 1, 2

Diagnosis—Rotund, subequilateral, umbo subcentral, prominent, incurved; sculpture of fine, sharp, concentric lirae, narrower than interspaces between which are numerous fine radials weaker than concentrics, not always regular and completely crossing the interspaces but sometimes merely producing the appearance of fine pittings. Concentrics generally, but not always, show impression of junction with radials and are then minutely scalloped. Lunule rather small, elongate-cordate, smooth, deep.

Description of Holotype—Left valve. Shell thin, of moderate size for the genus, convex, subcircular, subequilateral. Posterior dorsal margin gently sloping, anterior dorsal margin slightly excavate near the umbo and gently oblique towards the anterior border which is, like the posterior border, slightly truncate. Ventral margin broadly rounded. Umbo subcentral, prominent, slightly inflated and incurved, directed anteriorly. Lunule fairly small, elongate-cordate, smooth, deep. Sculpture of numerous, fine, sharp concentric lirae, 5 per mm., narrower than interspaces between which are numerous fine radials weaker than the concentrics, not always regular and completely crossing the interspaces, but short and irregular, giving the appearance of fine pittings. Junction of radials and concentrics nearly always indicated by scalloping of the concentrics. Hinge teeth obsolete in left valve. Ligament groove long, internal. Internal ventral margin smooth, area inside pallial line chalky and inclined to be pitted. Anterior adductor scar elongate-oval, pointed dorsally, posterior scar shorter and broader and pointed at both ends. Pallial line simple.

Dimensions—Length 12, height 11, inflation (one valve) 3 mm.

Type Locality—Hindmarsh Bore, 450-487 feet; Pliocene.

Location of Holotype—Tate Mus. Coll., Univ. of Adelaide. F 15126.

Observations—Compared with the type species *M. ramsayi* (Smith) *idonea* is a smaller shell, with more valid radials and sharper concentrics. The shell is more evenly rounded posteriorly. The umbo is more prominent and more incurved; the lunule is deeper. Internally, the area inside the pallial line is not so punctate as in *ramsayi*. The species is also very similar to *M. elegans* (Defrance) from the European Eocene, from which it differs principally in shape and rotundity. There is no doubt that all three species are congeneric.

Material—Holotype and 5 topotypes, left valves, Hindmarsh Bore.

Stratigraphical Range—Dry Creek Sands.

Geographical Distribution—Hindmarsh Bore, Adelaide.

Subgenus PROPHETILORA Iredale, 1930

Prophetilora Iredale, 1930. Mem. Qld. Mus., 10, (1), p. 75.

Type species (monotypy) *Prophetilora arisla* Iredale

***Monitilora (Prophetilora) chavani* sp. nov.**

pl. 2, fig. 13

Lucina leucomorpha Tate. N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 15 (non Tate).

Diagnosis—Quadrately orbicular, posterior margin slightly truncated, surface sculptured with numerous regular concentric lirae, narrower than interspaces, slightly retroflexed anteriorly. Interspaces with inconspicuous and somewhat irregular radial grooves. Hinge edentulous.

Description of Holotype (right valve)—Shell of medium size, quadrately orbicular, anteriorly excavate beneath the umbo and rounded; slightly truncated posteriorly. Umbo small, only slightly incurved, strongly directed anteriorly, approximate. Lunule short, cordate, deeply impressed and transgressing the hinge area. Hinge edentulous, ligament long, internal, deeply impressed; anterior muscle scar very long, within the pallial line and parallel to it for two-thirds its length; posterior scar elongate ovate, pointed at each end. Pallial line entire. Interior inside pallial line chalky, roughened. Pallial line entire. Internal ventral margin smooth. Shell externally sculptured with fine regular concentric lirae 3 per mm., slightly retroflexed anteriorly, narrower than interspaces. Interspaces with fine conspicuous and somewhat irregular radials, visible only under magnification; two straight umbo-posterior radial grooves marking the posterior wing and two rather deeper grooves, concave dorsally, on the anterior wing.

Dimensions—Length 18.5, height 17, inflation (one valve) 4 mm.

Paratype (left valve)—Hinge edentulous, lunule very deep, ligament deep.

Dimensions—Length 13, height 11.5, inflation (one valve) 2.5 mm.

Type Locality—Abattoirs Bore, Adelaide; Pliocene.

Location of Holotype—Tate Mus. Coll., Univ. of Adelaide. F 15127.

Observations—The nearest relative to this species is the Recent *M. (P.) arizela* Iredale, from North Queensland. The fossil species is more regularly and strongly sculptured and the posterior radial grooves are less strong.

Material—Holotype, 2 paratypes.

Stratigraphical Range—Dry Creek Sands.

Geographical Distribution—Abattoirs Bore, Adelaide.

Genus EOMILTHA Cossmann, 1912

Eomiltha Cossmann, 1912. Act. Soc. Linn., Bordeaux, 65, p. 269.

Type species (o.d.) *Lucina contorta* DeFrance

Subgenus GIBBOLUCINA Cossmann, 1904

Gibbolucina Cossmann, 1904. Bull. Soc. Geol. Normandie, 23, p. 13.

Type species (monotypy) *Lucina callosa* Lamarck

Eomiltha (*Gibbolucina*) *salebrosa* (N. H. Woods)

pl. 6, fig. 3

Codakia salebrosa N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 149, pl. 8, fig. 4, 5.

Epicodakia salebrosa (Hooper Woods), Cotton, 1947. Rec. S. Aust. Mus., 8, (4), p. 663.

Diagnosis—Thick, rude, irregular, sculptured with concentric striae and irregular growth lines becoming lamellose near ventral margin. Hinge teeth obsolete.

Dimensions—Length 27.5, height 26.7 mm.

Type Locality—Abattoirs Bore, Adelaide; Pliocene.

Location of Holotype—Tate Mus. Coll., Univ. of Adelaide.

Observations—This species was described from the Abattoirs Bore, and although Cotton has since recorded it, the writer has not seen it in any other boring. It is a typical *Gibbolucina*, very like the species *G. ellipsoidalis* from the European Eocene. The appearance of the European genus in the Australian Pliocene is worthy of some note, but there appears to be considerable similarity between the lucinid fauna of the European Eocene and of the Adelaide Pliocene.

Material—Three topotypes, Abattoirs Bore.

Stratigraphical Range—Dry Creek Sands.

Geographical Distribution—Adelaide District.

Eomiltha (Gibbolucina) confirmans sp. nov.

pl. 2, fig. 11.

Diagnosis—A small *Gibbolucina*, moderately thick and rough, subglobose with prominent elevated umbo. Sculpture of concentric ridges of irregular shape with prominent growth folds near the ventral margin. Hinge rather coarse with a central pit bordered by the posterior cardinal 4 overhanging the weaker median 2b in the left valve. Right valve with an oblique 3b and an anterior lateral A I. Posterior border rounded, anterior somewhat effuse.

Description of Holotype (right valve)—Shell small, subglobose, moderately thick and rough. Umbo prominent, elevated, well-incurved and prosogyrate. Sculpture of concentric ridges about 6 per mm. somewhat irregular and crowding near the ventral margin. Growth folds conspicuous. Lunule small and cordate, deep, smooth, bounded by a ridge. Hinge fairly thick with the lunule transgressing the area and attaching to the oblique 3b above, leaving a triangular pit beneath. Anterior lateral A I well developed and conspicuous. Interior of valve striate and secondarily thickened. Anterior adductor of moderate length, considerably narrower in the ventral portion which is inside and separated from the pallial line. Posterior adductor elongate-ovate, pointed dorsally. Valve much more convex inside the pallial line and flattening out between the pallial line and the ventral border. Margin plain.

Dimensions—Length 9 (estimated unbroken 10), height 9, inflation (one valve) 3 mm.

Paratype—Juvenile, left valve, somewhat doubtfully belonging to the same species. Shell with anterior margin complete, expanded towards the dorsal margin, posterior margin slightly broken in this specimen also. Lunule deep, transgressing the hinge. Hinge with a small median cardinal 2b and a longer posterior cardinal 4 overhanging the 2b.

Dimensions—Length 8, height 7, inflation (one valve) 2 mm.

Type Locality—Hindmarsh Bore, 450-487 feet.

Location of Holotype—Tate Mus. Coll. F 15128.

Observations—The presence of the second species of *Gibbolucina* in the fauna confirms the existence of the genus in the Australian Pliocene. It is a small *Gibbolucina*, nearest to the type species *callosa* and considerably less rude than *salebrosa*.

Material—Holotype and paratype, Hindmarsh Bore.

Stratigraphical Range—Dry Creek Sands.

Geographical Distribution—Hindmarsh Bore, Adelaide.

Genus LINGA de Gregorio, 1885

Linga de Gregorio, 1885. Bull. Soc. Malac. Ital., 10, p. 217.

Type species (s.d. Sacco, 1901) *Lucina columbella* Lamarck

Subgenus BELLUCINA Dall, 1901

Bellucina Dall, 1901. Proc. U.S. Nat. Mus., 23, p. 806.

Type species (o.d.) *Parvilucina eucosmia* Dall.

Linga (Bellucina) nuciformis (Tate)

pl. 2, fig. 14, 15

Lucina nuciformis Tate, 1886. Trans. Roy. Soc. S. Aust., 8, pl. 12, fig. 10.

Lucina nuciformis Tate, 1887. *id.* 9, p. 144.

Lucina nuciformis Tate, Harris, 1897. Cat. Tert. Moll. Brit. Mus., 1, p. 385.

Lucina nuciformis Tate, Dennant and Kitson, 1903. Rec. Geol. Surv., Vict., 1, (2), p. 139, 147.

Lucina nuciformis Tate, N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 151.

Epicodakia nuciformis. Tate, Cotton, 1947. Rec. S. Aust. Mus., 8, (4), p. 655.

Diagnosis—Shell small, globose, very thick, sculptured with subacute concentric ridges, about 2 per mm., the interspaces sometimes crossed with fine radials. Margins of valves strongly crenulated.

Dimensions—Length 9, height 9, section (both valves) 8 mm.

Type Locality—Oyster beds, Blanche Point, Aldinga Bay; Pliocene.

Location of Holotype—Tate Mus. Coll., Univ. of Adelaide.

Observations—Together with *Callucina balcombica*, *nuciformis* is the most commonly occurring lucinid in the Dry Creek Sands. It is a typical *Bellucina* comparable with the European Eocene *B. ligata* and with the Indo-Pacific type species *eucosmia* Dall. It is not an *Epicodakia*.

Material—Five valves, Weymouth's Bore, 5 valves Abattoirs Bore, 5 valves Hindmarsh Bore. Six topotypes L 9871. B.M. Coll.

Stratigraphical Range—South Australian Pliocene.

Geographical Distribution—Aldinga and Adelaide, South Australia.

Genus CALLUCINA Dall, 1901

Callucina Dall, 1901. Proc. U.S. Nat. Mus., 23, p. 806.

Type species (o.d.) *Lucina radians* Conrad

Callucina (s.l.) *balcombica* (Cossman)

pl. 2, fig. 10

Lucina affinis Tate, 1887 b. Trans. Roy. Soc. S. Aust., 9, p. 143, pl. 18, fig. 11.

Lucina affinis Tate, Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 126, 139, 147.

Lucina balcombica (nom. mut. for *affinis* preoccupied) Cossmann, 1912. Rev. Ctit. de Paleozoöl., 16, (3), p. 214.

Lucina balcombica Cossmann, Finlay, 1927. Trans. N.Z. Inst., 57, p. 529.

Lucina affinis Tate, N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 151.

Epicodakia affinis Tate, Cotton, 1947. Rec. S. Aust., Mus., 8, (4), p. 654.

Diagnosis—Roundly subquadrate, sculptured with numerous fine, concentric threads about 8 per mm. Internal margin finely crenulate.

Dimensions—Length 6, height 5.5, inflation (left valve) 1.75 mm.

Type Locality—Oyster beds, N.W. Bend, River Murray; Pliocene.

Location of Holotype—Tate Mus. Coll., Univ. of Adelaide.

Observations—This species is of frequent occurrence in the borings. It is not an *Epicodakia*. The left valve has two divergent cardinal teeth, one (4b) generally close to the umbo and coincident with the nymph, the other (2) lower and sometimes sunken, laterals (P II and A II) both weak or absent. Right valve with a relatively strong high cardinal tooth (3b) channelled medially. Laterals P I and A I weak to absent. The marginal crenulations are very fine and narrow, on the margin only and scarcely extending on to the internal layer of the shell. External sculpture is finely concentric, with no suggestion of radials.

The species belongs to a group of *Callucina* typified by "*Lucina*" *albella* of the French Eocene.

Material—Ten valves Weymouth's Bore, 9 valves Hindmarsh Bore.

Stratigraphical Range—Pliocene.

Geographical Distribution—Gippsland, Victoria — Adelaide, South Australia.

Genus GONIMYRTEA Marwick, 1929

Gonimyrtea Marwick 1929. Trans. N.Z. Inst., 59, p. 912.

Type species (o.d.) *Loripes concinna* Hutton

Gonimyrtea salisburyensis sp. nov.

pl. 2, fig. 12

Loripes icterica Reeve, N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 151.

Diagnosis—Shell small, thin, quadrately orbicular, truncate posteriorly, rounded anteriorly. Sculpture of fine concentric striae and microscopic irregular radials. Obsolete curved radial sulci visible in oblique light.

Description of Holotype (left valve)—Shell small, thin, quadrately orbicular; posterior margin truncate, almost vertical, anterior margin roundly produced. Post-dorsal margin straight, sloping; anterior-dorsal margin excavate near umbo,

then almost horizontal. Ventral margin roundly curving; interior obscurely crenate. Sculpture of very fine and irregular growth striae between which are very faint and fine crowded concentric threads visible only under magnification crossed by microscopic somewhat irregular and bifurcating radial markings. In addition to the microscopic ornament, under strong light curved radii which are concave anteriorly are visible. From the umbo to the postventral margin there is a shallow and obsolete radial sulcus. Interior of valve striate. Hinge somewhat narrow, with two diverging cardinal teeth with a triangular pit between, laterals absent. Ligament pit long and narrow, sunken. Lunule elongate-cordate, only slightly impressed. Adductor impressions well marked, anterior impression elongate, inside pallial line.

Dimensions—Length 12.5, height 12, inflation (one valve) 3 mm.

Paratype (right valve)—Hinge with one triangular cardinal tooth and one somewhat indefinite anterior lateral.

Dimensions (specimen broken)—Length 9, height 8, inflation 2 mm.

Type Locality—Abattoirs Bore, Adelaide; Pliocene.

Location of Holotype—Tate Mus. Coll., Univ. of Adelaide. F 15129.

Observations—This is the shell formerly recorded as *Loripes icterica* (Reeve). Whether the Recent shell also known as *Loripes icterica* and *Wallucina icterica* (Cotton and Godfrey, 1938, p. 203) is conspecific is at present left open to doubt until an opportunity is given to examine Recent South Australian specimens. Examination of the holotype of *Lucina icterica* Reeve in the British Museum Collection has revealed that this shell is not a Lucinid but a *Semele*, described from three Museum Cuming shells from an unknown locality. It has been identified in the British Museum Collection with *Semele proficua* Pulteney. It is not here intended to investigate the correct identity of Reeve's *icterica*, which is certainly not the shell hitherto known under that name from Australia. The present species is somewhat difficult to place. It is not a *Wallucina* as the hinge bears little resemblance to that of *Loripes* (*Wallucina*) *jacksoniensis*, type species of *Wallucina*; in relation to the width of the hinge the teeth of *salisburyensis* are small; in *jacksoniensis* the hinge is very narrow, scarcely wider than the dorsal margin, while the cardinal teeth are relatively long and prominent; the ligament of *salisburyensis* differs completely from that of *jacksoniensis* which is entirely internal and transgresses the hinge area. The hinge and general characters approximate most closely to those of *Callucina balcombica*; both species have two cardinal teeth in the right valve, although in *salisburyensis* there is a tendency to obsolescence of the posterior of the two.

Material—Holotype and Paratype, Abattoirs Bore; 3 valves Hindmarsh Bore, 1 valve Weymouth's Bore.

Stratigraphical Range—Dry Creek Sands; (?) Recent.

Geographical Distribution—Fossil, Adelaide, (?) Recent Victoria — West Australia.

Gonimyrtia crassior sp. nov.

pl. 3, fig. 3, 4

Diagnosis—A fairly thick *Gonimyrtia* with a high conspicuous umbo. Lunule fairly deep, moderately elongate-cordate, smooth but for growth lines. Sculpture less regular than in the species *notabilior* and *validior* and growth folds conspicuous. Sculpture of concentric lirae 5 per mm. narrower than the interspaces which are not so flat as in the species *notabilior* or *validior*.

Description of Holotype (right valve)—Shell of moderate size, fairly thick, umbo subcentral, high, pointed, conspicuous. Posterior dorsal margin gently curving, anterior dorsal margin excavate beneath the umbo, then almost straight. Posterior margin truncate, anterior margin oblique for a short distance, then roundly curved. Growth folds conspicuous and fairly deep. Sculpture of con-

centric lirae 5 per mm., narrower than interspaces which are only sometimes flat; lirae tend to be truncated by an umbo-anterior-ventral sulcus, and not all extend over the whole of the shell. Lunule fairly deep, moderately elongate-cordate, smooth but for growth striae. Interior of valve radially striate. Inner margin raised; pallial line impressed; anterior adductor impression fairly long and moderately broad; posterior adductor subovate, very pointed dorsally. Hinge with a single cardinal (3b) and a well developed anterior lateral (A I).

Dimensions—Length 9.5, height 9, inflation (one valve) 3 mm.

Paratype (left valve)—Hinge with a deep subumbonal pit for the reception of 3b in the right valve and two diverging cardinals 2 and 4b, 2 bordering the lunule. Ligament pit long and deep.

Dimensions—Length 8, height 7, inflation (one valve) 2.5 mm.

Type Locality—Weymouth's Bore, Adelaide, 310-330 feet; Pliocene.

Location of Holotype and Paratype—Tate Mus. Coll., Univ. of Adelaide, F 15130.

Observations—The height of the umbo, coarser sculpture, and greater thickness of the shell are distinguishing features of the species.

Material—Holotype, 2 paratypes, Weymouth's Bore.

Stratigraphical Range—Dry Creek Sands.

Geographical Distribution—Weymouth's Bore, Adelaide.

Gonimyrtea validior sp. nov.

pl. 3, fig. 5, 6

Diagnosis—A *Gonimyrtea* of moderate thickness with a relatively low umbo, sculptured with well-spaced concentric lirae about 4 per mm. with fairly broad, flat interspaces about three times as wide as the lirae. Inner margin raised. Lunule shallow, inconspicuous, not margined.

Description of Holotype (left valve)—Shell small, moderately thick, sub-orbicular, moderately inflated. Umbo subcentral, moderately inflated, gently incurved, prosogyrate. Shell depressed and somewhat broadly sulcate in the anterior dorsal area. Dorsal margin nearly straight, posterior margin gently curved, anterior margin descending obliquely at an angle of about 120° to the dorsal margin, then roundly curving to the ventral margin. Ventral margin strongly curved. Sculpture of fine concentric lirae about 4 per mm., broadly spaced, narrow, and where they are not broken inclined to be recurved towards the umbo; interspaces nearly three times as wide as lirae, broad flat, showing faint growth threads. Lunule shallow, inconspicuous, not margined. Hinge nearly straight with two small sharp diverging cardinals (2 and 4b) curved convex to the posterior; laterals absent except for an obsolete pit for the reception of the anterior lateral of the right valve. Anterior adductor impression of moderate length and fairly broad, posterior adductor ovate, pointed dorsally. Pallial line punctate at broad intervals. Interior ventral margin raised.

Dimensions—Length 9, height 8, inflation (one valve) 2 mm.

Paratype (right valve)—Hinge with an oblique posterior cardinal (3b) and a weak anterior lateral (A I).

Dimensions—Length 8, height 7, inflation (one valve) 1.5 mm.

Type Locality—Hindmarsh Bore, 450-487 feet; Pliocene.

Location of Holotype and Paratype—Tate Mus. Coll., Univ. of Adelaide, F 15131.

Observations—The relatively more widely spaced concentric sculpture, together with the rather low umbo, serve to distinguish this species from the other small *Gonimyrtea* species described. It has the characteristic raised inner margin of *Gonimyrtea* and typical hinge, with laterals somewhat obsolete.

Material—Holotype and paratype, Hindmarsh Bore. Ten paratypes Weymouth's Bore.

Stratigraphical Range—Dry Creek Sands.

Geographical Distribution—Weymouth's and Hindmarsh Bores, Adelaide.

Gonimyrtrea notabilior sp. nov.

pl. 3, fig. 7, 8

Diagnosis—A rather thin *Gonimyrtrea* with a moderately high umbo very smooth at the tip, well incurved and prosogyrate, sculptured with fine regular concentric lirae about 5 per mm., nearly half of which extend over the central part of the shell only, separated by interspaces about twice as wide as the lirae. Inner margin only slightly raised. Lunule elongate-cordate, bounded by a ridge crossed by growth striae.

Description of Holotype (right valve)—Shell of moderate size, fairly thin, suborbicular, longer than high, inflated. Umbo sub-central, fairly high, smooth at tip, well incurved, prosogyrate. Sculpture of fine regular smooth concentric lirae, about 5 per mm., almost every other one of which extends over the central part of the shell only, so that there are fewer lirae on the posterior and anterior portions. Interspaces smooth and flat, about twice as wide as the lirae. There is a sulcus extending from the umbo to both the post-ventral and anterior ventral borders. Lunule elongate-cordate, bounded by a ridge, crossed by concentric growth striae. Interior of valve radially striate particularly inside the pallial line. Margin only slightly raised; pallial line marked but not conspicuous in the holotype; interior adductor of moderate width, posterior adductor ovate. Hinge with a bifid cardinal (3b) and a conspicuous anterior lateral (A 1), ligament pit long and deep.

Dimensions—Length 11, height 10 inflation (one valve) 3 mm.

Paratype (left valve)—Hinge with two diverging cardinals (2 and 4b). Laterals absent.

Dimensions—Length 10, height 9, inflation (one valve) 3 mm.

Type Locality—Hindmarsh Bore, 450-487 feet; Pliocene.

Localtion of Holotype—Tate Mus. Coll., Univ. of Adelaide, F 15132.

Observations—This species is separable from the preceding *G. validior* by its conspicuous lunule, relatively close concentric sculpture and less raised inner margin. The umbo is higher than in *validior*.

Material—Holotype and paratype and six topotypes, Hindmarsh Bore; four valves Weymouth's Bore.

Stratigraphical Range—Dry Creek Sands.

Geographical Distribution—Hindmarsh Bore, Adelaide.

Genus MILTHA H. & A. Adams, 1857

Miltha H. and Adams, 1857. Gen. Rec. Moll., 2, p. 468

Milthoidea Marwick, 1931. N.Z. Geol. Surv. Pal. Bull., 13, p. 70.

Type species (monotypy) *Tellina childreni* Gray

Miltha hora (Cotton)

Dosinia grandis N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 148, pl. 7, fig. 5, 6. (non *grandis* Nelson 1870).

Miltha (*Milthoidea*) *grandis* (Hooper Woods, 1931). Singleton and Woods, 1934. Proc. Roy. Soc. Vict., 46, (n.s.), (2), p. 208-210, pl. 8, fig. 1-3.

Miltha grandis N. H. Woods, Chavan, 1938. Jour. de Conch., 82, (3), p. 230.

Milthoidea hora (nom. mut. for *grandis* preocc.) Cotton, 1947. Rec. S. Aust. Mus., 8, (4), p. 663.

Diagnosis—Large, solid, slightly convex, sculpture of irregular numerous raised threads about 1 mm. apart in the adult portion of the shell, the interspaces with one or more fine threads crossed by fine radials. Hinge plate with broad, triangularly elongate ligament groove and triangular area for resilium. Lunule deeply impressed, transgressing hinge area.

Dimensions (estimated)—Length 70, height 70 mm.

Type Locality—Abattoirs Bore, Adelaide; Pliocene.

Location of Syntypes—Tate Mus. Coll., Univ. of Adelaide, T 1687.

Observations—It is almost impossible to get complete specimens of this large and characteristic species, owing to the fact that shells of such size are invariably shattered by the percussion drill. Chavan (1938, p. 230) has placed the species in *Miltha*, and elsewhere (p. 656) has expressed the opinion that *Milthoidea* is synonymous with *Miltha*. M. Chavan has confirmed this in a personal communication, stating that he is unable to recognize good criteria for separating *Milthoidea* from *Miltha*. The juvenile specimen from Hindmarsh Bore seems at least conspecific with the Flinders Island example described by Singleton and Woods as *Miltha* (*Milthoidea*) *grandis flindersiana*, probably also a juvenile.

Material—Four hypotypes, one of which is a juvenile, Hindmarsh Bore. One hypotype, Kooyonga Bore.

Stratigraphical Range—Pliocene.

Geographical Distribution—Port Phillip Bay, Victoria — Adelaide, South Australia; Flinders Island.

Genus DIVALUCINA Iredale, 1936

Divalucina Iredale, 1936. Rec. Aust. Mus., 19, p. 273.

Type species (monotypy) *Lucina cumingi* Adams and Angas

Divalucina cumingi (Adams and Angas)

pl. 3, fig. 9

Lucina (*Cyclas*) *cumingi* Adams and Angas, 1863. Proc. Zool. Soc., p. 426, pl. 37, fig. 20.

Lucina dentata Wood. Tate, 1886. Trans. Roy. Soc. S. Aust., 8, pl. 12, fig. 3.

Lucina quadrisulcata d'Orbigny. Tate, 1887. *id.* 9, 145.

Lucina quadrisulcata d'Orbigny. Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 139, 147.

Divaricella quadrisulcata d'Orbigny. N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55 p. 151.

Divalucina entypoma Cotton, 1947. Rec. S. Aust. Mus., 8, (4), p. 663, pl. 20, fig. 9, 10.

Diagnosis—Orbicular, truncated posteriorly, longer than high, finely sculptured with divaricate ridges which are approximately 4 per mm. near the umbo and become progressively more distant towards the ventral margin; at 20 mm. from the umbo about 1 per mm.; distances somewhat variable between individuals; ridges generally becoming abruptly obsolete near the anterior dorsal margin.

Dimensions—Length 41, height 38.5 mm.

Type Locality—St. Vincent Gulf, South Australia; Recent.

Location of Holotype—Brit. Mus. (Natural History).

Observations—This is one of the commonest species in the Dry Creek Sands. The writer has compared a number of examples from Weymouth's Bore with the Adams and Angas type and also with a range of examples of *cumingi* from Tasmania and from Sydney Harbour, and is convinced that the fossil examples are essentially the same species. In his diagnosis of the new species *entypoma* Cotton has stated that the fossil species is closely related to the South Australian Recent species *cumingi* though differing in fineness of sculpture. On fitting fossil specimens against the holotype one finds that the sculpture over the same portion of the shell is the same in both. The number of ridges per 10 mm. (measured at the angle of the divaricate sculpture) in the last 10 mm. of an Adelaide shell is 20, and the number of ridges in the corresponding portion of the holotype (measured at the same distance from the umbo) is 20. The reason for the apparent difference in fineness of sculpture is that the number of ridges so measured decreases towards the ventral margin with the increasing size of the shell. The holotype of *D. cumingi* is a large shell for the species, approximately double the size of the average fossil specimen. Specimens of *cumingi* from

Tasmania and from New South Wales are somewhat larger than, but otherwise similar to those from the Dry Creek Sands. The relative dimensions of the holotype and a typical Dry Creek Sands specimen are as follows:

	Holotype	Dry Creek Sands Specimen
Height	38.5 mm.	19 mm.
Length	41	20.5
Inflation	20	10

The genus *Divalucina* was created by Iredale for *Divaricella cumingi* on the absence of a deep pseudo-lunule, the presence (not absence as stated by Cotton, 1947, p. 664) of notable lateral teeth and the size of the cardinals. The ornamentation of *Divaricella* is of raised sharp ribs, of *Divalucina* imbricating ridges.

Material—Holotype, 6 valves Sydney Harbour, 6 valves Tasmania, 16 valves Hindmarsh Bore, 26 valves Weymouth's Bore.

Stratigraphical Range—Dry Creek Sands and Recent.

Geographical Distribution—New South Wales and South Australia.

Family UNGULINIDAE

Subfamily UNGULININAE

Genus DIPLODONTA Bronn, 1831

Diplodonta Bronn, 1831. *Erget. nat. Reisen*, 2, p. 484.

Diplodonta Bronn, Thiele, 1935. *Handb. Syst. Weicht.*, p. 863 (synonymy).

Type species (s.d. Gray 1847) *Venus lupina* Brocchi

Subgenus DIPLODONTA s.str.

Diplodonta (Diplodonta) solitaria N. H. Woods

pl. 6, fig. 4

Diplodonta solitaria N. H. Woods, 1931. *Trans. Roy. Soc. S. Aust.*, 55, p. 149, pl. 8, fig. 3.

Zemysia solitaria Hooper Woods, Cotton, 1947. *Rec. S. Aust. Mus.*, 8, (4), p. 654.

Diagnosis—Orbicular, fairly stout, only moderately convex, higher than long. Umbo subcentral.

Dimensions—Length 22.8, height 26.7 mm.

Type Locality—Abattoirs Bore, Adelaide; Pliocene.

Location of Holotype—Tate Mus. Coll., Univ. of Adelaide. T 1685.

Observations—There are no further specimens of this species described from Abattoirs Bore material. Its identity with "*D. subquadrata* Tate" has been queried (Cotton, 1947, p. 654). The specific name *subquadrata* being preoccupied by Carpenter (1855, *Proc. Zool. Soc.*, p. 230) for a Californian shell, Tate's *subquadrata* was renamed *D. balcombensis* by Pritchard (1906, *Vict. Nat.*, 23, p. 119). *D. solitaria* is orbicular and not subquadrate.

It is a fairly large stout shell, higher than long, with the umbo subcentral. *D. balcombensis* is a thin, inequilateral shell, longer than high, with the umbo at about one-third from the anterior border; one specimen in the British Museum measures, length 23.5, height 22 mm.—about twice the size of the holotype. *Zemysia* was introduced by Finlay for *Lucina zelandica* Gray, no generic diagnosis being given. Thiele has placed it in synonymy with *Diplodonta*. The writer has not been able to examine the New Zealand lineages quoted by Finlay, but considers that South Australian shells at least are *Diplodonta*, congeneric with the type species *D. lupina* (Brocchi). *D. tasmanica* is very close to the Californian *D. subquadrata* Carpenter.

Material—Holotype, T 1685.

Stratigraphical Range—Dry Creek Sands.

Geographical Distribution—Adelaide District.

Genus NUMELLA Iredale, 1924

Numella Iredale, 1924. *Proc. Linn. Soc. N.S.W.*, 49, (3), p. 206.

Type species (o.d.) *Mysia adamsi* Angas

Numella suborbicularis (Tate)

Sacchia suborbicularis Tate, 1887. Trans. Roy. Soc. S. Aust., 9, p. 147, pl. 8, fig. 10 a-c.

Mysia (Felania) suborbicularis Tate, 1894. Jour. Roy. Soc. N.S.W., 27, p. 187.

Diplodonta suborbicularis Tate (sp.) Harris, 1897. Cat. Tert. Moll. Brit. Mus., 1, p. 376.

Diplodonta suborbicularis Tate. Dennant and Kitson 1903. Rec. Geol. Surv. Vict., 1, (2), p. 125, 139.

Diagnosis—Triangularly orbicular, rounded posteriorly and somewhat produced anteriorly. Umbones smooth, remainder of shell with distant growth folds.

Dimensions—Length 7.5, height 8, inflation (one valve) 3.75 mm.

Type Locality—Oyster Beds, River Murray Cliffs; Pliocene.

Location of Holotype—Tate Mus. Coll., Univ. of Adelaide, T 1081.

Material—Three valves, Lower Beds, Muddy Creek, B.M. Coll.

Stratigraphical Range—Miocene and Pliocene.

Geographical Distribution—Port Phillip Bay, Victoria — Adelaide South Australia.

Subfamily THYASIRINAE**Genus THYASIRA Lamarck, 1818**

Thyasira Lamarck (ex Leach MS), 1818. Anim. s. Vert., 5, p. 492.

Thyasira Lamarck. Thiele 1935. Handb. Syst. Weicht., p. 864 (synonymy).

Type species (monotypy) *Tellina flexuosa* Montagu

***Thyasira sinuata* (N. H. Woods)**

pl. 6, fig. 6

Cryptodon sinuatum N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 149, pl. 8, fig. 6.

Diagnosis—Small thin, very inflated, sculptured only with growth striae, anterior border truncate, posterior with two folds.

Dimensions—Length 8.1, height 8.2 mm.

Type Locality—Abattoirs Bore, Adelaide, S. Australia; Pliocene.

Location of Holotype—Tate Mus. Coll., Univ. of Adelaide, T 1653.

Observations—The genus *Cryptodon* Turton, 1822, in which this species was originally described, is, among others, a synonym of *Thyasira*. The full synonymy of the genus is given in Thiele, 1935, p. 864.

Material—Holotype T 1653.

Stratigraphical Range—Dry Creek Sands.

Geographical Distribution—Abattoirs Bore.

Superfamily LEPTONACEA**Family KELLIIDAE****Genus BORNIA Philippi, 1836**

Bornia Philippi, 1836, Enum. Moll. Sicil., 1, p. 18.

Type species (o.d.) *Erycina corbuloides* Philippi

***Bornia trigonale* (Tate)**

pl. 3, fig. 10

Lepton trigonale Tate, 1879. Trans. Phil. Soc. Adel. for 1878/9, p. 131, pl. 5, fig. 9.

Lepton trigonale Tate, 1890 a. Trans. Roy. Soc. S. Aust., 13, (2), p. 175.

Lepton trigonale Tate. Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 146.

Lepton trigonale Tate. N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 151.

Diagnosis—Triangularly ovate, somewhat flattish, smooth in the middle but shagreened or punctate marked on the anterior and posterior sides.

Dimensions—Length 3.8, height 3.5 mm.

Type Locality—Holdfast Bay, South Australia; Recent.

Location of Holotype—S. Aust. Mus., Reg. No. 12904.

Observations—Although not numerous, this shell has appeared in all the bores examined. It was also recorded by Tate as frequent in the Dry Creek Bore.

Material—One valve, Weymouth's Bore, 3 valves Hindmarsh Bore, 3 valves Abattoirs Bore. Eight valves South Australia, 12 valves Victoria, Recent B.M. Coll.

Stratigraphical Range—Dry Creek Sands and Recent.

Geographical Distribution—Southern Australia.

Family ERYCINIDAE

Genus LITIGIELLA Monterosato, 1909

Litigiella Monterosato, 1909. Journ. de Conch., 55, (4th ser. 10), p. 254.

Type species (Monotypy) *Erycina cuenoti* Lamy = *Lepton glabrum* Fischer

Litigiella adelaidensis sp. nov.

pl. 3, fig. 11

Lepton crassum Tate. N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 151.

Diagnosis—A small, subovate, moderately thick, moderately solid, gently convex *Litigiella*. Umbo post-median, inconspicuous, slightly inflated. Surface shining, smooth but for fine concentric growth lines. Anterior and posterior margins rounded, ventral margin nearly straight, dorsal margin gently arched. Adductor scars and pallial line inconspicuous. Right valve with a very small and inconspicuous anterior cardinal and a long posterior and anterior lateral separated by a deep subumbonal inflexion in the hinge.

Paratype—Left valve with the hinge slightly broken in the posterior. A single strong cardinal, posterior lateral and anterior lateral.

Dimensions—Length 4.5, height 3.5, inflation (one valve) 1 mm.

Type Locality—Hindmarsh Bore, 450-487 feet; Pliocene.

Location of Holotype and Paratypes—Tate Mus. Coll., Univ. of Adelaide. F 15133.

Observations—The Dry Creek Sands species is differently sculptured from the probable Miocene species with which it is formerly identified. It is nearly smooth, and lacks the concentric grooves and ridges of *Litigiella crassa* (Tate).

Material—Holotype and two paratypes.

Stratigraphical Range—Dry Creek Sands.

Geographical Distribution—Hindmarsh and Abattoirs Bores, Adelaide.

Genus MYLLITA d'Orbigny and Recluz, 1850

Myllita d'Orbigny and Recluz, 1850. Journ. de Conch., 1, (3), p. 288.

Type species (monotypy) *Myllita deshayesi* d'Orbigny and Recluz.

Type species (monotypy) *Myllita deshayesi* d'Orbigny and Recluz.

pl. 3, fig. 12

Diagnosis—Elongate-ovate, sculptured with about 23 concentric lirae obsolete anteriorly and posteriorly and bifurcating radial striae which are dominant on the anterior and posterior.

Description of Holotype (right valve)—Shell small, fairly solid, elongate-ovate, inequilateral, anteriorly dilated and rounded. Posteriorly narrower and more sharply ovate. Umbo small, smooth, somewhat depressed. Surface sculptured with about 23 concentric lirae prominent in the middle and becoming obsolete both anteriorly and posteriorly; interspaces crossed by very fine radial striae. On the anterior and posterior areas the radial striae gradually increase in strength and length and soon cross and dominate the concentric sculpture, producing the effect of bifurcating lirae curving concave to the dorsal margin. Hinge with no cardinal but two lateral teeth and two long lateral pits for the reception of the left laterals.

Dimensions—Length 3·8, height 2·6, inflation (1 valve) 1 mm.
Paratype (left valve)—Hinge with a single sharp almost vertical cardinal tooth and two strong laterals.

Dimensions—Length 3, height 2·4, inflation (1 valve) 0·8 mm.

Type Locality—Hindmarsh Bore, Adelaide, 450-487 feet; Pliocene.

Location of Holotype—Tate Mus. Coll., Univ of Adelaide, F 15134.

Material—Holotype and paratype only, Hindmarsh Bore.

Stratigraphical Range—Dry Creek Sands.

Geographical Distribution—Hindmarsh Bore, Adelaide.

Family LEPTONIDAE

Genus PROPERYCINA Cerulli-Irelli, 1908

Properycina Cerulli-Irelli, 1908. Pal. Ital., 14, p. 6.

Type species (s.d.) *Erycina mariana* Cerulli-Irelli

Properycina micans (Tate)

pl. 6, fig. 15

Kellia micans Tate, 1887 b. Trans. Roy. Soc. S. Aust., 9, p. 148, pl. 19, fig. 13.

Kellya micans Tate, Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 139.

Erycina micans Tate, Chapman and Crespin, 1928. Rec. Geol. Surv. Vict., 5, (1), p. 157.

Erycina micans Tate, N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 151.

Diagnosis—Minute, transversely ovate, anterior side produced, dorsal margins oblique, ventral margin rounded. Surface sculpture of concentric striae.

Dimensions—Length 3, height 2·5, inflation (one valve) 2 mm.

Type Locality—Muddy Creek, Hamilton, Victoria; Pliocene.

Location of Holotype—Tate Mus. Coll., Univ. of Adelaide, T. 1077.

Material—Holotype and three paratypes; 5 valves, Abattoirs Bore.

Stratigraphical Range—Pliocene.

Geographical Distribution—Gippsland, Victoria — Adelaide, South Australia.

Properycina torrensensis; sp. nov.

pl. 3, fig. 13

Diagnosis—Flattish, transversely oval, smooth, equilateral.

Description of Holotype (right valve)—Shell small, thin, smooth, equilateral. Umbo very small, depressed, scarcely projecting above the dorsal margin. Hinge narrow, with one oblique cardinal tooth beneath the umbo, a long posterior lateral and a shorter but prominent anterior lateral. Shell very slightly produced anteriorly; evenly rounded posteriorly. Anterior-dorsal margin slightly more oblique than posterior; ventral margin straight. Surface smooth but not shining, under magnification showing weak concentric growth folds and microscopic irregular pittings.

Dimensions—Length 7, height 5·1, inflation (1 valve) 1 mm.

Paratype (left valve)—Hinge with an obsolete cardinal visible only in oblique light and one very weak lateral on either side, bordering the lower edge of the hinge. Grooves for the reception of the laterals of the right valve well marked.

Dimensions—Length 5·5, height 4, inflation 0·8 mm.

Type Locality—Hindmarsh Bore, 450-487 feet; Pliocene.

Location of Holotype and Paratypes—Tate Mus. Coll., Univ of Adelaide, F 15135.

Material—Holotype, two paratypes.

Stratigraphical Range—Dry Creek Sands.

Geographical Distribution—Hindmarsh Bore.

? *PLATOMYSIA* sp.

A single right valve, conspicuously concentrically lirate.

Stratigraphical Range—Dry Creek Sands.

Geographical Distribution—Hindmarsh Bore.

Genus MONTACUTA Turton, 1822

Montacuta Turton, 1822. *Conch. Insul. Brit.*, p. 58.*Coriarius* Hedley, 1907. *Rec. Aust. Mus.*, 6, (4), p. 301.Type species (s.d. Gray, 1847) *Ligula substriata* Montagu**Montacuta sericea** Tate

pl. 3, fig. 15

Montacuta sericea Tate, 1887 b. *Trans. Roy. Soc. S. Aust.*, 9, p. 148, pl. 14, fig. 6.*Mysella sericea* Tate. Dennant and Kitson, 1903. *Rec. Geol. Surv. Vict.*, 1, (2), p. 124, 139.*Montacuta sericea* Tate. N. H. Woods, 1931. *Trans. Roy. Soc. S. Aust.*, 55, p. 151.*Rochefortia donaciformis* Angas. N. H. Woods, 1931, *ibid.**Montacuta sericea* Tate. Cressin, 1943. *Min. Res. Surv. Bull.*, 9, p. 93.*Coriarius sericea* Tate. Cotton, 1947. *Rec. S. Aust. Mus.*, 8, (4), p. 654.*Diagnosis*—Very inequilateral, rather solid, glossy. Umbones sited at one-quarter total length from anterior edge, small, curved anteriorly.*Dimensions*—Length 6.5, height 5, inflation (both valves) 3 mm.*Type Locality*—Muddy Creek, Hamilton, Victoria; Kalimnan.*Location of Holotype*—Tate Mus. Coll., Univ. of Adelaide. Numerous specimens, Abattoirs Bore, 7 valves.*Material*—Hindmarsh Bore.*Stratigraphical Range*—Miocene and Pliocene.*Geographical Distribution*—Gippsland, Victoria — Adelaide, South Australia.

Genus MYSELLA Angas, 1877

Mysella Angas, 1877. *Proc. Zool. Soc.*, p. 176, pl. 26, fig. 22.*Rochefortia* Velain, 1877. *Arch. Zool. exp. gen.*, Paris, 6, p. 132.Type species (monotypy) *Mysella anomala* Angas**Mysella anomala** Angas

pl. 3, fig. 14

Mysella anomala Angas, 1877. *Proc. Zool. Soc.*, p. 176, pl. 26, fig. 22.*Mysella anomala* Angas. Dennant and Kitson, 1903. *Rec. Geol. Surv. Vict.*, 1, (2), p. 146.*Rochefortia anomala* Angas. N. H. Woods, 1931. *Trans. Roy. Soc. S. Aust.*, 55, p. 151.*Diagnosis*—Triangularly ovate, compressed towards the ventral edge, very finely and regularly concentrically ridged; umbo at about one-quarter to one-third length from anterior edge.*Dimensions*—Length 9.5, height 7, inflation (both valves), 3 mm.*Type Locality*—Shark Island, Port Jackson, 12 fathoms; Recent.*Location of Holotype*—B.M. Coll.*Observations*—Fossil specimens are somewhat narrower than typical *anomala*.*Material*—Holotype, 1 paratype, Shark Island, 1 complete specimen and 3 valves, S. Australia. Recent, B.M. Coll., 3 valves Abattoirs Bore, 1 valve Hindmarsh Bore.*Stratigraphical Range*—Dry Creek Sands and Recent.*Geographical Distribution*—New South Wales to South Australia.**Mysella ovalis** Tate*Mysella ovalis* Tate, 1892. *Trans. Roy. Soc. S. Aust.*, 15, p. 128.*Mysella ovalis* Tate. N. H. Woods, 1931, *id.*, 55, p. 151.*Diagnosis*—Transversely oval, hinge line arched, the anterior slope incurved and shorter than posterior, which is straight. Anterior margin truncately rounded, posterior somewhat pointed. Umbones antemedian.*Dimensions*—Length 14.5, height 10, inflation (both valves) 4.25, anterior radius 6, posterior radius 8.5 mm.*Type Locality*—Hardwicke Bay, 10 fathoms; Recent.*Location of Holotype*—S. Aust. Mus., No. D12893.

Material—Holotype.

Stratigraphical Range—Dry Creek Sands and Recent.

Geographical Distribution—Beachport - Wallaroo, South Australia.

Mysella macer (N. H. Woods)

pl. 6, fig. 8

Rochefortia macer N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 151, pl. 7, fig. 3.

Diagnosis—Broadly subovate, relatively high, somewhat narrowly produced posteriorly, postero-dorsal margin at about 45°.

Dimensions—Length 11.1, height 9.3 mm.

Type Locality—Abattoirs Bore, Adelaide; Pliocene.

Location of Holotype—Tate Mus. Coll., Univ. of Adelaide, T 1679.

Material—Holotype; one specimen Hindmarsh Bore.

Stratigraphical Range—Dry Creek Sands.

Geographical Distribution—Abattoirs and Hindmarsh Bores, Adelaide.

Mysella tellinoides (N. H. Woods)

pl. 6, fig. 7

Rochefortia tellinoides N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 148, pl. 7, fig. 4.

Diagnosis—Narrowly ovate; umbones small, not tumid, situated at about one-third from anterior margin.

Dimensions—Length 5.7, height 3.6 mm.

Type Locality—Abattoirs Bore, Adelaide; Pliocene.

Location of Holotype—Tate Mus. Coll., Univ. of Adelaide, T 1676.

Observations—Except for one right valve from the Hindmarsh Bore, referable to this species, from which it differs in its relative dimensions (length 6.5, height 5 mm.), examples of *Mysella tellinoides* have not been found in any other bore than Abattoirs, from which it was described.

Material—1 right valve, Hindmarsh Bore.

Stratigraphical Range—Dry Creek Sands.

Geographical Distribution—Abattoirs Bore, Hindmarsh Bore.

Suborder **CYCLODONTA**

Superfamily **CARDIACEA**

Family **CARDIIDAE**

Subfamily **TRACHYCARDIINAE**

Genus **VASTICARDIUM** Iredale, 1927

Vasticardium Iredale, 1927. Rec. Aust. Mus., 16, (1) p. 75.

Type species (o.d.) *Cochlea nebulosa* Martyn = *Cardium elongatum* Bruguière

Subgenus **VASTICARDIUM** s.str.

Vasticardium (*Vasticardium*) *submaculosum* sp. nov.

pl. 4, fig. 18

Diagnosis—A small thin *Vasticardium* somewhat obliquely ovate, truncated posteriorly, sculptured with 56 fine, radial costae smooth dorsally and ornamented with evenly spaced imbricating scales towards the ventral border. Posterior ornament discrepant, consisting of ten pairs of ribs alternately one smooth and narrow and one sharply tuberculate, each narrower than interspaces.

Description of Holotype (right valve)—Shell small for the genus, rather thin, longitudinally ovate, somewhat depressed, slightly oblique, subequilateral. Anterior margin rounded, posterior margin more rapidly descending and somewhat truncated; ventral margin roundly curving. Umbo fairly high, smooth, incurved, prosogyrate, subcentral. Hinge typical, fairly short, nearly straight, with a prominent cardinal (3b) and one obsolete, divergent, almost horizontal cardinal (3a) and one anterior (LAI) and one posterior lateral (LP I). Nymph

prominent. Sculpture of 56 delicate, evenly-spaced radial costae, slightly wider than interspaces. Costae smooth in the convex umbo-dorsal area, sculptured on the posterior side with regular imbricating scales towards the ventral margin; scales extending over the ribs anteriorly. The posterior 10 short ribs divide and develop into one narrow smooth rib and one sharply tuberculate rib, each narrower than the interspaces. Last three anterior short ribs are tuberculate for almost their entire length. Interior of ventral margin crenulate; posterior margin digitate. Pallial line invisible, adductor impressions prominent, sub-equal.

Dimensions—Length 23.6, height 28.7, inflation (one valve) 8.5 mm.

Type Locality—Weymouth's Bore, Adelaide, 310-330 feet; Pliocene.

Location of Holotype—Tate Mus. Coll., Univ. of Adelaide. F15136.

Observations—This shell is very close indeed to the Recent *Vasticardium maculosum* (Wood) (1835, p. 218, pl. 52, fig. 3) from the Indian Ocean and North Australia. The fossil species is a thinner shell with the following differences from *maculosum* der posterior ribs (one smooth, one tuberculate) are arranged in the fossil so that the smooth narrow rib is above (dorsal) and close to the adjacent tuberculate rib; in the Recent shell the relative positions are reversed and the smooth rib is below the tuberculate rib. For most specimens, the main ribs are more definite and sharply squamose in the fossil. This character, however, varies to a certain degree in the Recent species. The anterior six ribs in *maculosum* are much more definitely tuberculate in contrast to the main ribs than are the corresponding ribs in *submaculosum*. The close relationship between the two species is noteworthy. Both species belong to a group of small species of *Vasticardium* represented also by *V. transcendens* (Melvill and Standen), examples from the Amirante Is., and *V. mauritianum* (Deshayes), examples from the Mollucas. The *V. maculosum* lineage would appear to have degenerated in Recent times in Australia. On the evidence of material available in the British Museum, specimens from North Queensland are all small, and at most half the size of examples of *maculosum* from the Gulf of Oman and Ceylon, and of the fossil *submaculosum*. The type locality of *maculosum* is not exactly known, but examples in the British Museum are Indo-Pacific.

Vasticardium was created by Iredale for *Cochlea nebulosa* Martyn = *Cardium elongatum* Bruguière, a large Indo-Pacific shell. The genus as a whole is Indo-Pacific, with the following generic characters: Shape longitudinally oval, hinge nearly straight, short; sculpture discrepant on posterior slope where ribs are divided and are alternately tuberculate and smooth, main ribs numerous, ornamented with imbricating scales on posterior sides. Posterior margin digitate. The genus is closely related to *Acrosterigma* of Dall (type species *Cardium dalli* Heilprin) from the Tertiary of Florida. The type species of *Vasticardium* has longer hinge than that of *Acrosterigma dalli*; the shell is more ovoid, the umbo more tumid and the cardinal teeth less divergent. The subumbonal median internal rib of *Acrosterigma* is not present in *Vasticardium* nor is there the internal umbonal-post-ventral rib-like thickening which occurs in *A. dalli*.

Material—Holotype, Weymouth's Bore, one broken left valve Thebarton Bore.

Stratigraphical Range—Dry Creek Sands.

Geographical Distribution—Weymouth's and Thebarton Bores, Adelaide.

Subgenus *REGOZARA* Iredale, 1936

Regozara Iredale, 1936. Rec. Aust. Mus., 19, p. 275.

Type species (o.d.) *Regozara olivifer* Iredale

Vasticardium (*Regozara*) *praecygnorum* sp. nov.

pl. 4, fig. 12

Cardium cygnorum Deshayes. Tate, 1890 a. Trans. Roy. Soc. S. Aust., 13, p. 175.

Cardium cygnorum Deshayes. Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 146.

Cardium cygnorum Deshayes. N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 151.

Diagnosis—A small *Regosara*, roundly ovate, sculptured with 48 radial ribs of which the posterior seven are narrow, with a row of widely spaced scales in the interspaces. Ribs elsewhere flatly rounded, with narrow interspaces, sculptured on the posterior side only with narrow widely spaced diagonal ridges which extend further across the rib towards the anterior where they are almost tuberculate. Interspaces crossed by growth lamellae which show as indistinct striae on the ribs.

Description of Holotype (right valve)—Shell small, rather thin, but immature, roundly ovate, subequilateral, umbo prominent incurved, subcentral. Hinge of moderate length, gently curved, with a prominent cardinal (3a), one anterior (LA1), and one posterior (LPI) lateral. Nymph broken in holotype but prominent. Sculpture of 48 radial costae, the posterior seven of which are narrow with a row of widely-spaced scales in the interspaces. Ribs elsewhere flatly rounded with narrow interspaces with steep sides, sculptured on the posterior side only with fairly smooth and widely spaced diagonal ridges which extend further across the ribs towards the anterior where they are almost tuberculate. Interspaces crossed by frequent growth lamellae which show as indistinct striae on the ribs. Interior of ventral margin crenulate, posterior margin digitate.

Dimensions—Length 22.5, height 23.5, inflation (one valve) 9 mm.

Type Locality—Dry Creek Bore, Adelaide; Pliocene.

Location of Holotype—Tate Mus. Coll., Univ. of Adelaide. F15137.

Paratype—The holotype is an immature shell and a larger broken specimen is selected from the tablet of six specimens mounted by Tate from Dry Creek Bore, with the following dimensions: Length 33, height (estimated) 35 mm.

Observations—This species has now been compared with the holotype and two paratypes of "*Cardium*" *cygnorum* Deshayes, and is distinct from that species. "*C.* *cygnorum*" is a large shell with 45 radial costae which are ornamented on both sides over all the shell. Iredale (1936, p. 276) has pointed out that New South Wales shells referred to "*Cardium*" *cygnorum* (typically from Western Australia) are not referable to *cygnorum*. From examination of a limited number of specimens in the British Museum, the writer is inclined to agree with this opinion; the species described above as *praecygnorum* appears to be more closely related to the New South Wales "*cygnorum*" than to *cygnorum* s. str.

Material—Holotype and five paratypes, Dry Creek Bore; many fragments Abattoirs Bore.

Stratigraphical Range—Dry Creek Sands.

Geographical Distribution—Dry Creek and Abattoirs Bores, South Australia.

Subfamily LAEVICARDIINAE

Genus FULVIA Gray, 1853

Fulvia Gray, 1853 Ann. Mag. Nat. Hist., Ser. 2, 11, p. 40.

Type species (monotypy) *Cardium apertum* Bruguière

Fulvia tenuicostata (Lamarck)

pl. 4, fig. 13

Cardium tenuicostatum Lamarck, 1819. Anim. s. Vert., 6, (1), p. 5.

Cardium ricketti Donovan, 1825. Nat. Repos., 4, pl. 124.

Cardium tenuicostatum Sowerby, 1832. Conch. 111, 5, fig. 19, 36, 62.

Cardium tenuicostatum Lamarck. Delessert, 1841. Rec. de Coq. par Lamarck, pl. 11, fig. 6.

Cardium tenuicostatum Lamarck. Reeve, 1843. Conch. Icon., 11, pl. 10, fig. 50.

Cardium tenuicostatum Lamarck. Catlow and Reeve, 1845. Conch. Nomen., p. 45.

Cardium tenuicostatum Lamarck. Tate, 1890 a. Trans. Roy. Soc. S. Aust., 13, (2), p. 175.

Cardium tenuicostatum Lamarck. Denham and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 146.

Cardium ricketti Donovan. Hedley, 1917. Proc. Linn. Soc. N.S.W., 41, (4), p. 685.

Cardium ricketti Donovan. May 1921. Check List, p. 22.

Cardium ricketti Donovan. May 1923. 111. Ind., p. 23, pl. 9, fig. 15.

Cardium ricketti Donovan. Cotton and Godfrey, 1938. Moll. S. Aust., 1, p. 227.

Diagnosis—A thin fragile, ventricose, quadrately-orbicular *Fulvia* swollen at the umbones, sculptured with from 45 to 50 fine smooth axial costae, equal to the interspaces which are faintly crossed by concentric growth striae.

Description of Hypotype (Dry Creek Bore)—Shell ventricose thin, fragile, quadrately orbicular, umbo prominent, prosogyrate, smooth. Surface of shell sculptured with 46 fine smooth radial ribs, sharply defined and equal to the interspaces, which are crossed by concentric growth striae. Posterior area somewhat discrepant with sculpture in the interspaces generally more prominent and inclined to be more widely spaced. There is a narrow smooth triangular area at both the posterior and anterior borders. Posterior margin smooth, not digitate.

Dimensions of Hypotype—Length 19, height 19 mm.

Dimensions of Hylotype—Length 56 mm.

Type Locality—Timor.

Location of Holotype—Mus. Hist. Nat., Paris.

Observations—Hedley (1917, p. 685) has advanced reasons for rejecting Lamarck's name *tenuicostata* and replacing it by Donovan's *racketti* for Australian shells, on the grounds that Delessert's figure represents a differently shaped shell, which cannot be identified. This is incorrect. The holotype of *tenuicostata* is lodged in the Lamarck Collections in the Natural History Museum in Paris where it was seen by the writer. Most of the examples of *tenuicostata* in the British Museum agree with Delessert's figure of the holotype in which the characteristic roseate colouring of the umbonal area is reproduced. The general shape of a wide range of specimens is that of Lamarck's type. One example from Port Jackson is slightly narrower and more abruptly sloping posteriorly, like the shell figured by Donovan. Hedley has also argued that Delessert's specimen is larger than Donovan's *racketti*. This surely is not a valid reason for rejecting a species; in any case, specimens from Western Australia are over 50 mm. in width. The rejection of *tenuicostata* on purely geographical grounds is fallacious.

It is difficult to reconcile the green colouring of Donovan's figure with the familiar white and pink colour of *tenuicostata*, and as the holotype of *racketti* has disappeared, its identification is impossible; the use of the name *racketti* for the Australian shell should be abandoned.

Reeve (1843, pl. 10, fig. 50) has noted that the number of ribs varies between individuals. Both Lamarck's and Donovan's shells have 47-48 ribs; the writer has counted over 50 in some specimens.

The species is represented in the Dry Creek Sands by four small examples from Dry Creek Bore, which show some slight divergence by having the interspaces somewhat more heavily crossed by concentric growth striae in the posterior area in most specimens.

Material—Holotype. The figured hypotype and three other specimens. Dry Creek Bore; numerous specimens. Recent, Australia, B.M. Coll.

Stratigraphical Range—Dry Creek Sands and Recent.

Geographical Distribution—Australia generally; Indo-Pacific (Challenger Expedition).

Subfamily PROTOCARDIINAE

Genus NEMOCARDIUM Meek, 1876

Nemocardium Meek, 1876. Dep. Int. Rep. U.S. Geol. Surv. Terr., 9, p. 167.

Type species (s.d. Sacco, 1899) *Cardium semiasperum* Deshayes.

Subgenus PRATULUM Iredale, 1924

Pratulium Iredale, 1924. Proc. Linn. Soc. N.S.W., 49, p. 182.

Type species (o.d.) *Cardium thetidis* Hedley

Nemocardium (Pratulium) proterothetidis sp. nov.

pl. 3, fig. 16, 17

Cardium hemimeris Tate, N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 151.

Diagnosis—Small, quadrately orbicular, longer than high. Umbo incurved, very slightly prosogyrate. Posterior tuberculate ornament over a little more than one-third of shell, with about 32 fine tuberculate ribs. Remainder of shell with fine smooth radials about 6 per mm. There is a marked umbo-post-ventral sulcus and a corresponding post-ventral insinuation.

Description of Holotype—Left valve. Shell thin, small, broadly quadrately ovate, longer than high, subglobose; umbo submedian, elevated, smooth, incurved and only very slightly prosogyrate. Ornament discrepant, posterior siphonal area a little more than one-third of shell with about 32 (5 per mm. ventrally) fine tuberculate radiating ribs; remainder of shell with very fine smooth radials, about 6 per mm. measured at the ventral margin, faintly and irregularly crossed by concentric growth striae. There is a marked umbo-post-ventral broad sulcus, producing a corresponding insinuation at the post-ventral margin. Dorsal margin gently rounded, anterior margin rounded, ventral margin only slightly rounded; posterior margin somewhat truncate, insinuate. Interior crenate all round. Hinge arched, narrow, with a prominent cardinal (2) and very small posterior cardinal (4b). Laterals (A II and P II) triangular and rather weak.

Dimensions—Length 9, height 8, inflation (one valve) 3 mm.

Type Locality—Abattoirs Bore, Adelaide; Pliocene.

Location of Holotype—Tate Mus. Coll., Univ. of Adelaide. F15138.

Observations—This is not the Janjukian-Balcombian *N. (P.) hemimeris* (Tate), as formerly identified. *N. (P.) hemimeris* is higher than long, has a much more strongly curved umbo, markedly prosogyrate, while the tuberculate posterior sculpture extends over half the valve. *N. (P.) proterothetidis* approximates more closely to the Recent *thetidis* Hedley, from which it differs in having a less inflated umbo, a longer hinge line and weaker marginal crenulations. The umbo-post-ventral sulcation is well marked in *proterothetidis* but is only faintly present in *thetidis*. The posterior margin is shorter and less oblique and there is not the tendency for the post-ventral margin to be produced as in *thetidis*.

Material—Holotype, Abattoirs Bore; 1 valve Hindmarsh Bore, 6 valves Weymouth's Bore.

Stratigraphical Range—Dry Creek Sands.

Geographical Distribution—Adelaide District.

Suborder TELEODONTA
Superfamily VENERACEA
Family DOSINIIDAE
Subfamily DOSINIINAE
Genus DOSINIA Scopoli, 1777

Dosinia Scopoli, 1777. Introd. Hist. Nat., Prague, p. 399.

Type species (s.d. Gray, 1847) *Venus exoleta* Linné

Subgenus KEREIA Marwick, 1927

Kereia Marwick, 1927. Trans. N.S. Inst., 57, p. 583.

Type species (c.d.) *Dosinia greyi* Zittel

Dosinia (Kereia) johnstoni Tate

Dosinia johnstoni Tate, 1887 b. Trans. Roy. Soc. S. Aust., 9, p. 161, pl. 14, fig. 9, 12.

Dosinia johnstoni Tate and Dennant, 1983. *id.* 17, (2), p. 225.

Dosinia johnstoni Tate. Dennant and Kitson, 1903. Rec. Geol. Surv., Vict., 1, (2), p. 125, 139.

Dosinia johnstoni Tate. N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 151.

Dosinia johnstoni Tate. Crespin, 1943. Min. Res. Surv. Bull., 9, p. 92.

Diagnosis—Sculptured with regular, thick, depressed concentric ridges, with reflexed acute edges, separated by deep linear sulci about 20 per 10 mm. near the ventral edge.

Dimensions—Length 27, height 25, inflation (one valve) 7 mm.

Type Locality—Upper Beds, Muddy Creek, Victoria; Pliocene.

Location of Holotype—Tate Mus. Coll., Univ. of Adelaide, T 1159.

Material—One complete specimen, 3 broken valves. Abattoirs Bore.

Stratigraphical Range—Miocene and Pliocene.

Geographical Distribution—Gippsland, Victoria — Adelaide, South Australia.

Family MERETRICIDAE

Subfamily MERETRICINAE

Genus NOTOCALLISTA Iredale, 1924

Notocallista Iredale, 1924. Proc. Linn. Soc. N.S.W., 49, p. 182.

Type species (o.d.) *Cytherea kingi* Gray

Subgenus STRIACALLISTA Marwick, 1938

Striacallista Marwick, 1938. Trans. Roy. Soc. N.Z., 68, p. 68.

Type species (o.d.) *Cytherea multistriata* Sowerby

Notocallista (*Striacallista*) *mollesta* Marwick

pl. 5, fig. 2

Macrocallista submultistriata Tate. N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 151 (pars).

Notocallista (*Striacallista*) *mollesta* Marwick, 1938. Trans. Roy. Soc. N.Z., 68, p. 73, pl. 13, fig. 7-9.

Diagnosis—Umbones low, sculpture of fine, regular concentric grooves and bevelled ridges 4-5 per mm. persisting across the disk. Ligament deep with high walls.

Dimensions—Length 26.5, height 19.5, inflation (one valve) 6.5 mm.

Type Locality—Abattoirs Bore, Adelaide; Pliocene.

Location of Holotype—N.Z. Geol. Surv. Coll., Wellington, N.Z.

Material—Hypotype (figured) Abattoirs Bore. Two valves Weymouth's Bore; 2 valves Thebarton Bore.

Stratigraphical Range—Dry Creek Sands.

Geographical Distribution—Adelaide District.

Notocallista (*Striacallista*) *pestis* Marwick

pl. 5, fig. 3

Notocallista (*Striacallista*) *pestis* Marwick, 1938. Trans. Roy. Soc. N.Z., 68, p. 73, pl. 13, fig. 3, 4.

Diagnosis—Umbones moderately conspicuous, sculpture of concentric grooves and ridges about 4 per mm. on the anterior and posterior parts and dying out over the middle of the disk. Ligament shallow, walls low.

Dimensions—Length 27, height 19, inflation (one valve) 5.5 mm.

Type Locality—Abattoirs Bore, Adelaide; Pliocene.

Location of Holotype—Auckland Museum, New Zealand.

Material—Four valves Weymouth's Bore, 1 valve Thebarton Bore.

Stratigraphical Range—Dry Creek Sands.

Geographical Distribution—Adelaide District.

Family VENERIDAE

Subfamily VENERINAE

Genus ANTIGONA Schumacher, 1817

Antigona Schumacher, 1817. Ess. Nouv. Syst. vers. Test, p. 155.

(*Proxichione* Iredale, 1929b. Aust. Zool., 5, (4), p. 339.)

Type species (monotypy) *Antigona lamellaris* Schumacher

Subgenus ANTIGONA s.str.

Antigona (Antigona) cognata (Pritchard)

Chione cognata Pritchard, 1903. Proc. Roy. Soc. Vict., 15, (2), 101, pl. 12, fig. 5.

Antigona dimorphophylla Tate. N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 151.

Diagnosis—Very large, solid, moderately tumid, umbo broad and only somewhat inflated, at anterior one-fourth, strongly directed anteriorly but not markedly incurved. Lunule impressed, finely lamellose, bounded by incised line. Ligament groove deep and long. Sculpture of high concentric lamellae corrugated anteriorly and posteriorly and numerous interstitial radials broader than inter-spaces.

Dimensions—Length 68, height 53 mm.

Type Locality—Grange Burn, near Hamilton, Victoria; Pliocene.

Location of Holotype—Melb. Univ. Geol. Dept., No. 1755.

Observations—Although in small numbers, the species has appeared in Abattoirs, Hindmarsh and Kooyonga Bores. Material under present observation is fragmentary, as the shells have been broken by the percussion drill, and accurate diagnosis is difficult. Previously, Adelaide examples have been placed in *dimorphophylla* (Tate), but on closer examination of a series of topotypes and other specimens of *dimorphophylla* it is considered that they have been wrongly placed and should be placed in *cognata*. The umbo of the present species is broader and less inflated than that of *dimorphophylla* and it is not so markedly incurved. The specimens are larger than *cognata* from the type locality and much heavier and more solid than *dimorphophylla*; estimated dimensions are length 82, height 65 mm. They very strongly resemble the Recent Indo-Pacific species *A. listeri* (Gray) and *A. reticulata* (Linné) the concentric lamellae are further apart than they are in *listeri* and the interstitial radials are finer and more closely set. The shape of the pallial sinus is more angular in *cognata* than in either *listeri* or *reticulata*.

Material—Two broken valves, Hindmarsh Bore; 2 broken valves Kooyonga Bore.

Stratigraphical Range—Pliocene.

Geographical Distribution—Gippsland, Victoria — Adelaide, South Australia.

Genus **DOSINA** Gray, 1835

Dosina Gray, 1835, in Yate, Account N.Z. Shells, p. 309.

(*Dorsina* Gray, 1840. Syn. Cont. Brit. Mus., ed. 42, p. 149.)

(*Dosinula* Finlay, 1926. Trans. N.Z. Inst., 57, p. 470.)

Type species (monotypy) *Dosina zelandica* Gray

Subgenus **HINA** Marwick, 1927

Hina Marwick, 1927, *Ibid.*, p. 602.

Type species (o.d.) *Marama pinguis* Marwick

Dosina (Hina) cainozoica Tenison-Woods (1)

pl. 5, fig. 5

Venus (Chione) cainozoica Tenison-Woods, 1877. Proc. Roy. Soc. Tas. for 1876, p. 113.

Chione cainozoica Tenison-Woods. Tate, 1887 b. Trans. Roy. Soc. S. Aust., 9, p. 156, pl. 16, fig. 3 a-b.

Chione cainozoica Tenison-Woods. Johnston, 1888. Geol. Tas., p. 233, pl. 32, fig. 8-8 a, 11-11 a.

Chione cainozoica Tenison-Woods. Tate and Dennant, 1893. Trans. Roy. Soc. S. Aust., 17, (1), p. 225

Chione cainozoica Tenison-Woods. Tate and Dennant, 1895, *id.*, 19, (1), p. 113.

Chione cainozoica Tate. Pritchard, 1896. Proc. Roy. Soc. Vict., 8, (n.s.), p. 135.

Chione cainozoica Tate. Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 125, 147.

Callanatis cainozoica T. Woods. N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 151.

Diagnosis—Somewhat globose, ornamented with numerous fine concentric threads, which at intervals are raised and lamellose; lamellae close and more

(1) Listed in Part I, p. 57, as *Antigona (Hina) cainozoica*.

numerous at anterior and posterior margins, thin and fragile; inter-lamellar threads are fine and equidistant. Inner ventral margin very finely crenulate; antero-dorsal margin also very finely crenulate, but not continuously with the ventral margin.

Dimensions—Length 22, height 18, inflation (both valves) 17 mm.

Type Locality—Table Cape, Tasmania.

Location of Holotype—Hobart Museum, Tasmania.

Observations—A single left valve from Weymouth's Bore belongs to this species which has been recorded also from Abattoirs and Croydon Bores. The Weymouth's Bore specimen, like a large adult specimen from the lower beds at Muddy Creek in the British Museum, shows a strong tendency to fine radial ornament, generally visible between the lirae in the adult portion of the shell, but most obvious on the under side of the lamellae where they have not been broken. The lamellae and lirae become almost frilled where the radials are well developed. The species is evidently long-ranging and very widespread; it has been recorded from almost every locality in Victoria, South Australia, and Tasmania, from Oligocene to Miocene, and survives to the Pliocene of the Dry Creek Sands.

Subfamily CIRCINAE

Genus GAFRARIUM Röding, 1798

Gafrarium Röding ex Bolten, 1798, Mus. Bolt., p. 176.

Type species (s.d. Dall, 1902) *Venus pectinata* Linné

Gafrarium perornatum N. H. Woods

pl. 6, fig. 9

Gafrarium perornatum N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 148, pl. 7, fig. 7, 8.

Diagnosis—Fairly small, transversely ovate. Umbones at anterior third. Sculpture of fine curving radials, separated by linear interspaces agulated and diverging at anterior third and also at posterior third; curving concavely towards dorsal margin.

Dimensions—length 9.6, height 7.5 mm.

Material—Holotype; one left valve, Weymouth's Bore, five specimens Lower Beds, Muddy Creek, L9888, one specimen L10587, B.M. Coll.

Stratigraphical Range—? Oligocene to Miocene; Dry Creek Sands.

Geographical Distribution—Southern Australia.

Subfamily CHIONINAE

Genus TAWERA Marwick, 1927

Tawera Marwick, 1927. Trans. N.Z. Inst., 57, p. 613

Type species (o.d.) *Venus spissa* Deshayes

Tawera pernitida (N. H. Woods)

pl. 6, fig. 5

Antigona pernitida N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 148, pl. 8, fig. 1, 2.

Antigona dictua Tate (?) = *Antigona pernitida* Hooper Woods. Cotton, 1947. Rec. S. Aust. Mus., 8, (4), p. 634.

Diagnosis—Transversely subovate, sculptured with fine, sharp, concentric raised threads, about 5 per mm., becoming lamellose towards the ventral border, with fine radial threads crossing the interspaces. Inner ventral margin finely crenulate all round except above post-dorsal hinge area.

Dimensions—Length 12.3, height 9.4 mm.

Type Locality—Abattoirs Bore, Adelaide; Pliocene.

Location of Holotype—Tate Mus. Coll., Univ of Adelaide, T 1673.

Observations—Cotton has with some justification queried the identity of the above species with *Tawera dictua* (Tate). The two species are similar in

general characters, but the radial sculpture is dominant in *dictua*, while the concentric sculpture is dominant in *pernitida*. Concentric sculpture in *pernitida* is more regular and sharper. *T. dictua* is a narrower shell than *pernitida*, the teeth are differently shaped, the umbo is higher and more inflated in *pernitida*, the hinge is shorter and broader in *pernitida*. It may be that habitat and mode of preservation account for the differences, which are none the less apparent.

Material—Holotypes, and paratypes, Abattoirs Bore, numerous specimens Hindmarsh Bore.

Stratigraphical Range—Dry Creek Sands.

Geographical Distribution—Abattoirs and Hindmarsh Bores.

Tawera gallinula (Lamarck)

pl. 3, fig. 20

Venus gallinula Lamarck, 1818. Hist. Nat. Anim. s. Vert., 5, p. 592.

Chione propinqua T. Woods, var. Tate, 1890. Trans. Roy. Soc. S. Aust., 13, (2), p. 175.

Chione propinqua T. Woods, var. Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 147.

Antigona propinqua Tate. N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 151 (pars).

Diagnosis—Elongate-ovate, somewhat truncate both anteriorly and posteriorly, sculptured with thin, erect lamellae. Whitish, with reddish-brown angular lines.

Dimensions—Length 35 mm.

Type Locality—King Island, Tasmania; Recent.

Location of Holotype—Mus. Hist. Nat., Paris.

Observations—A single juvenile right valve from Abattoirs Bore formerly classified as *Antigona propinqua* is here referred to the species *gallinula*.

Attention is here drawn to the fact that the figures for the two species *Tawera gallinula* and *Tawera lagopus* in Cotton and Godfrey's "The Mollusca of South Australia" have been transposed.

Material—One valve, Abattoirs Bore. Seven complete specimens locality not specified, and eight complete specimens, Tasmania, B.M. Coll.

Stratigraphical Range—Dry Creek Sands and Recent.

Geographical Distribution—Southern Australia from New South Wales to Western Australia.

Tawera incurvilamellata sp. nov.

pl. 3, fig. 18, 19

Antigona propinqua Tate. N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 65, (1), p. 151 (pars).

Diagnosis—A fairly flat *Tawera* with umbo at anterior two-fifths sculptured with raised lamellae about $\frac{3}{4}$ mm. apart, each incurved towards the ventral margin. Radials obsolete.

Description of Holotype (right valve)—Shell fairly small, elongate-oval, inequilateral, somewhat attenuated at the post-ventral edge, fairly flat. Umbo prosogyrate, moderately inflated, incurved, situated about two-fifths from anterior margin. Prodissoconch smooth, shining small. Early part of shell with twelve slightly raised lamellae, five per mm. followed in adult shell by twelve raised lamellae, about three-quarters of a mm. apart, rounded and incurved towards the ventral margin. Towards the posterior border the lamellae flatten out and become somewhat waving as they converge towards the margin. Underneath the overhanging portions, on the ventral side of each lamella are obsolete radial riblets. These extend faintly into the interspaces and are visible only in reflected light. Interspaces with frequent insignificant growth striae. Hinge typical of *Tawera*, well developed. Inner margin finely crenulate. Pedal retractor well marked, separated from anterior adductor. Pallial sinus deep, rounded.

Dimensions—Length 13.6, height 9.5, inflation (one valve) 3 mm.

Type Locality—Abattoirs Bore, Adelaide; Pliocene.

Location of Holotype—Tate Mus. Coll., Univ. of Adelaide. F15139.

Observations—This shell is unlike any other examined. In general shape it bears resemblance to the foregoing shell classified as *T. gallinula*, from which it differs in its very characteristic concentric sculpture which distinguishes it also from the so-called "*Chione*" *propinqua* of the "Kalimnan." A larger example reaches a length of 20 mm.

Material—The holotype and 11 paratypes, Abattoirs Bore.

Stratigraphical Range—Dry Creek Sands.

Geographical Distribution—Abattoirs Bore, Adelaide.

Genus *PLACAMEN* Iredale, 1925

Placamen Iredale, 1925. Rec. Aust. Mus. 14, (4), p. 225

Type species (monotypy) *Pectunculus fasciatus* Da Costa

Placamen subroborata (Tate)

pl. 4, fig. 2, 3

Chione subroborata Tate, 1887 b. Trans. Roy. Soc. S. Aust., 9, p. 156, pl. 14, fig. 17.

Chione subroborata Tate. Harris, 1897. Cat. Tert. Moll. Brit. Mus., 1, p. 374.

Chione subroborata Tate. Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 125, 139, 146.

Clausinella subroborata Tate. N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 151.

Placamen subroborata Tate. Cotton and Godfrey, 1938. S. Aust., p. 238.

Diagnosis—Trigonal, broad in front, subrostrate posteriorly. Sculpture of about 15 concentric lamellae which are rather thick and recurved except on posterior slope where they are erect.

Dimensions—Length 25, height 24, umbo to post-ventral angle 25, inflation (both valves) 14 mm.

Type Locality—Muddy Creek, Hamilton, Victoria; Pliocene.

Location of Holotype—Tate Mus. Coll., Univ. of Adelaide, T 1169.

Material—Five valves, Weymouth's Bore, all juveniles; 11 valves, including the figured hypotype Muddy Creek, Victoria, No. L6605, 9884, L4830, L25790; 4 valves, Bairnsdale, L355, B.M. Coll.

Stratigraphical Range—Pliocene.

Geographical Distribution—Gippsland, Victoria — Adelaide, South Australia.

Genus *BASSINA* Jukes-Brown 1914

Bassina Jukes-Brown, 1914. Proc. Mal. Soc., 11, p. 81.

(*Callanaitis* Iredale, 1917. *id.* 12, (6), p. 329.)

Type species (o.d.) *Venus paucilamellata* Sowerby

Bassina allporti (Tenison-Woods)

Venus allporti Tenison-Woods, 1876 a. Proc. Roy. Soc. Tas. for 1875, p. 26, pl. 3, fig. 10.

Chione allporti Tenison-Woods. Tate, 1887 b. Trans. Roy. Soc. S. Aust., 9, p. 154.

Chione allporti T. Woods. Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 125, 139

Bassina allporti T. Woods. N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 151.

Diagnosis—Ovately oblong, anterior subangulated, sculptured with 12 distant lamellae.

Dimensions—Length 29, height 19 mm.

Type Locality—Table Cape, Tasmania.

Location of Holotype—Hobart Museum.

Material—Two valves, Abattoirs Bore.

Stratigraphical Range—Oligocene to Pliocene.

Geographical Distribution—Gippsland, Victoria — Adelaide, South Australia.

Genus TIMOCLEA BROWN, 1827

Timoclea Brown, 1827, Ill. Conch. G.B. & I., pl. 19, fig. 11.

Type species (monotypy) *Venus ovata* Pennant

Subgenus VEREMOLPA Iredale

Veremolpa Iredale, 1930. Rec. S. Aust. Mus., 17, p. 397.

(*Glycydonta* Cotton, 1936. Rec. S. Aust. Mus., 5, (4), p. 503.)

Type species (monotypy) *Veremolpa ethica* Iredale

Timoclea (Veremolpa) protomarica (Cotton)

Glycydonta protomarica Cotton, 1936. Rec. S. Aust. Mus., 5, (4), p. 504, text fig. 1.

Diagnosis—Hinge with twelve Glycymerid-like teeth on either side of the three cardinals; sculpture of about twelve concentric lamellae, with numerous regular, subordinate radial ribs which fimbriate the concentric lamellae.

Dimensions—Length 9, height 7·8, inflation 5·4 mm.

Type Locality—Torrenville Bore 490 feet; Pliocene (cited in original description as 49·0 feet, Upper Pliocene).

Location of Holotype—St. Aust. Mus., Reg. No. D12888.

Observations—This species has apparently not been found since it was described from Torrenville Bore. It is obviously very close indeed to the Indo-Pacific "*Venus*" *marica* Linné which Cotton cited as the type species of *Glycydonta*. The alleged differences between this genus and Iredale's *Veremolpa* seem to be ontogenetic and hardly of generic magnitude.

Material—Holotype.

Stratigraphical Range—Dry Creek Sands.

Geographical Distribution—Torrenville Bore, Adelaide District.

Genus CHIONERYX Iredale, 1924

Chioneryx Iredale, 1924. Proc. Linn. Soc. N.S.W., 49, (3), 197, p. 210.

Type species (o.d.) *Venus striatissima* Sowerby

Chioneryx dennanti (Chapman and Crespin)

pl. 4, fig. 19

Chione striatissima Sowerby. Tate, 1890. Trans. Roy. Soc. S. Aust., 13, (1), p. 175.

Chione striatissima Sowerby. Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 146.

Antigona dennanti Chapman and Crespin, 1928. Rec. Geol. Surv. Vict., 5, (1), p. 104, pl. 12, fig. 82.

Antigona striatissima Tate. N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 151.

Antigona dennanti Chapman and Crespin. Crespin, 1943. Min. Res. Surv. Bull., 9, p. 92.

Diagnosis—Fairly small, umbo at anterior third; adult shell with about 22 waving, slightly raised concentric lamellae, about 16 per cm. Interspaces crossed by strong flattish radial riblets, equal in width to the spaces between them, undulation on the lamellae corresponding to the riblets, and somewhat irregular and undulating concentric growth lines crowding the interspaces between the lamellae.

Dimensions—Length 25, height 19, inflation (both valves) 12 mm.

Type Locality—Jemmy's Point, Lakes Entrance, Victoria; Kalimnan.

Location of Holotype—Dennant Coll., National Museum, Melb.

Description of Hypotype (right valve)—Shell small, solid, transversely oval, umbo prosogyrate, situated one-third of length of shell from anterior margin, somewhat elevated and tumid, incurved. Prodissoconch polished, smooth except for concentric threads, of which there are five, and faint incipient radial riblets. Adult shell with 22 waving, slightly raised concentric lamellae, about 16 per cm. Interspaces crossed by strong flattish radial riblets, equal in width to the spaces between them, the undulations on the lamellae corresponding to the riblets, and somewhat irregular and undulating concentric growth lines crowding the interspaces between the lamellae. Lunule large, nearly smooth, elongate-cordate, bounded by a sharply incised line cutting across the concentric lamellae and

growth lines which continue weakly over the lunule. Escutcheon narrow, long, bounded by a slight ridge. Hinge teeth widely divergent, consisting in the right valve of a small, entire, narrow, moderately strong anterior (3a) parallel to the lunular margin, a median triangular grooved (1), and a strong posterior cardinal, raised and grooved (3b). Pallial sinus short, rounded. Pedal retractor small, separated from the anterior adductor.

Internal margin crenate, with the exception of the posterior dorsal edge.

Dimensions—Length 15.3, height 13.2, inflation (one valve) 4 mm. (left valve). Hinge with a high posterior cardinal (4b), joined to the nymph, sub-triangular moderate and unequally divided median (2b), and an entire, high, narrowly-triangular diverging anterior cardinal (2a).

Dimensions—Length 11.1, height 8.8, inflation (one valve) 2.9 mm.

Material—Numerous specimens, Weymouth's Bore.

Observations—This shell has previously been identified as *Venus striatissima* Sowerby (= *Erycina cardioides* Lamarck) the type species of Iredale's genus *Chioneryx*. Iredale (1924, p. 210) has pointed out that in transferring *Erycina cardioides* to *Venus*, Sowerby changed the specific name to *striatissima*, since the name *cardioides* was already preoccupied in *Venus* by Lamarck's *Venus cardioides* (1818, p. 590). With creation of a new genus *Chioneryx* for the species, Iredale advocated a reversion to Lamarck's name *cardioides*. The species is now listed in Australian literature as *Chioneryx cardioides* (Lamarck) (Cotton and Godfrey, 1938, p. 240, *et al.*). It must be pointed out, however, that the name *cardioides* is a suppressed homonym for this species, and cannot be used again (Int. Rules Zool. Nomen., Art. 36). Secondly, there has not been universal acceptance of full generic status for *Chioneryx*. In (Thiele, 1935, p. 890) *Chioneryx* is given subgeneric rank under *Venus*, which still leaves *cardioides* as a homonym. In view of these factors, the specific name *striatissima* should be used as formerly and *cardioides* kept suppressed.

The fossil species *dennanti* is superficially like *striatissima* particularly in the external sculpture, but the shape of the shell generally differs in its greater relative height, and it is only occasionally subrostrate; the umbones are higher and more inflated; the marginal crenulations are finer in *dennanti*. The hinge of *dennanti* is intermediate between *Tawera* and *Chioneryx*, the teeth being less divergent than in *Chioneryx*, but nearer to *Chioneryx* than to *Tawera*; the strength of the radial sculpture is intermediate between the two, but nearer to that of *Chioneryx* than to that of *Tawera*. Marwick (1927, p. 613) has suggested that *Chioneryx* may be a Recent development of the *Tawera* stock. Present evidence strongly supports this and *dennanti* is undoubtedly antecedent to *Chioneryx* in the *Tawera-Chioneryx* lineage.

In shape the species *dennanti* is variable; ratio length: height varies from 1.26 in the longer shells to 1.15 in the relatively higher shells.

Materials—About 70 valves, Weymouth's Bore, 4 valves Abattoirs Bore.

Stratigraphical Range—Pliocene.

Geographical Distribution—Gippsland, Victoria — Adelaide, South Australia.

Subfamily TAPETINAE

Genus PAPHIA Röding, 1798

Paphia Röding ex Bolton, 1798. Mus. Bolt., p. 175.

Type species (s.d. Dall, 1902) *Paphia alapapilionis* Röding

Paphia sp.

Paphia fabogelloides Tate. N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 151.

Observations—A Tate manuscript name appears to have been used for a specimen from Abattoirs Bore. As the single specimen so named has been damaged and description is impossible, the name should be removed from the list of species occurring in the Dry Creek Sands.

Genus VENERUPIS Lamarck, 1818

Venerupis Lamarck, 1818. Anim. s. vert., 5, p. 506.Type species (s.d. Children, 1823) *Venus perforans* Montagu*Venerupis paupertina* Tate*Venerupis paupertina* Tate, 1887 b. Trans. Roy. Soc. S. Aust., 9, p. 162, pl. 14, fig. 15.*Venerupis paupertina* Tate. Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 139.*Venerupis paupertina* Tate. Cotton, 1947. Rec. S. Aust. Mus., 8, (4), p. 654.*Diagnosis*—Umbo large, conspicuous, cordate, lunule well defined; sculptured with flat radial ribs equal to the interspaces.*Dimensions*—Length 12, height 7, inflation (both valves) 5 mm.*Type Locality*—Muddy Creek, Hamilton, Victoria; Pliocene.*Location of Holotype*—Tate Mus. Coll., Univ of Adelaide, T 1206B.*Material*—One broken specimen, Abattoirs Bore.*Stratigraphical Range*—Pliocene.*Geographical Distribution*—Gippsland, Victoria — Adelaide, South Australia.

Superfamily TELLINACEA

Family SANGUINOLARIIDAE

Genus GARI Schumacher, 1817

Gari Schumacher, 1817. Ess. Nouv. Syst. Test., pp. 44, 131.(*Psammobia* Lamarck, 1818. Hist. Nat. Anim., s. Ver., 5, p. 511.)Type species (tautonymy) *Gari vulgaris* Schumacher = *Tellina gari* Linné*Gari hamiltonensis* (Tate)

pl. 4, fig. 17

Psammobia Hamiltonensis Tate, 1885. Southern Science Record, p. 4 (*vide* Tate, 1887).*Psammobia Hamiltonensis* Tate, 1887 b. Trans. Roy. Soc. S. Aust., 9, p. 167, pl. 16, fig. 13.*Gari hamiltonensis* Tate. Harris, 1897. Cat. Tert. Moll. Brit. Mus., 1, p. 377.*Gari hamiltonensis* Tate. Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 125, 139.*Psammobia hamiltonensis* Tate. N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 151*Gari hamiltonensis* Tate. Cressin, 1943. Min. Res. Surv. Bull., 9, p. 93.*Diagnosis*—Attenuated anteriorly, obliquely truncated posteriorly, post-dorsal margin gently sloping, post-ventral margin roundly curved to meet oblique posterior margin.*Dimensions*—Length 31, height 15 mm.*Type Locality*—Upper Beds, Muddy Creek, Victoria; Pliocene.*Location of Holotype*—Tate Mus. Coll., Univ. of Adelaide, T 1190A.*Observations*—Both this and the following species have been found in the Abattoirs Bore only.*Material*—The figured hypotype, Abattoirs Bore; 10 topotypes, B.M. Coll., Nos. L4819, L9891, L25789.*Stratigraphical Range*—? Miocene; Pliocene.*Geographical Distribution*—Gippsland, Victoria — Adelaide, South Australia.*Gari aequalis* (Tate)*Psammobia aequalis* Tate. Southern Science Record, Jan. 1885, p. 4 (*vide* Tate, 1887).*Psammobia aequalis* Tate, 1887 b. Trans. Roy. Soc. S. Aust., 9, p. 168, pl. 16, fig. 10.*Gari aequalis* Tate. Harris, 1897. Cat. Tert. Moll. Brit. Mus., 1, p. 378.*Gari aequalis* Tate. Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 125, 139.*Psammobia aequalis* Tate. N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 151.*Diagnosis*—Roundly truncated posteriorly, umbo medial, depressed, no posterior keel.*Dimensions*—Length 22, height 11 mm.*Type Locality*—Upper Beds, Muddy Creek, Victoria; Pliocene.*Location of Holotype*—Tate Mus. Coll., Univ. of Adelaide, T 1189B.

Material—Seven topotypes B.M. Coll., Nos. L.4819, L.9891.

Stratigraphical Range—Miocene and Pliocene.

Geographical Distribution—Gippsland, Victoria — Adelaide, South Australia.

Family TELLINIDAE

Genus MACOMA Leach, 1819

Macoma Leach, 1819, in Ross, Voy. Dis., Baff. Bay. Appendix 2, pl. 12.

Type species (monotypy) *Macoma tenera* Leach = *Tellina calcarea* Linné

Macoma ralphi (Finlay)

pl. 4, fig. 9, 10

Tellina aequilatera Tate, 1887 b. Trans. Roy. Soc. S. Aust., 9, p. 166, pl. 16, fig. 5 a-b, 9 a-b, pl. 20, fig. 19.

Tellina aequilatera Tate. Tate and Dennant, 1893. *id.* 17, (1), p. 225.

Tellina aequilatera Tate. Harris, 1897. Cat. Tert. Moll. Brit. Mus., 1, p. 187.

Tellina aequilatera Tate. Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 127, 139.

Tellina ralphi (Finlay, 1927). Trans. N.Z. Inst., 57, p. 530. *nom. mut.* for *aequilatera*).

Diagnosis—Somewhat convex, post-dorsal margin straight, more steeply sloping than in front. Anterior margin broadly rounded, slightly incurved; posterior narrower, abruptly and narrowly rounded at the edge. A shallow and somewhat broad radial sulcus from the umbo to the post-ventral border, producing a slight insinuation at the border.

Dimensions—Length 52, height 35, inflation (one valve) 8.5 mm.

Type Locality—Upper Beds, Muddy Creek, Victoria; Pliocene.

Location of Holotype—Tate Mus. Coll., Univ. of Adelaide, T 1213A.

Observations—The species occurs rarely in the Miocene only at Camperdown and near Morgan, and has a sparse though wide distribution in the Lower Pliocene of Victoria.

Material—Two topotypes, No. 9863, B.M. Coll., 3 valves Weymouth's Bore, 2 valves Hindmarsh Bore.

Stratigraphical Range—Miocene and Pliocene.

Geographical Distribution—Gippsland, Victoria — Adelaide, South Australia.

Genus TELLINA Linné, 1758

Tellina Linné, 1758. Syst. Nat., ed. 10, p. 674.

Type species (s.d. Children, 1823) *Tellina radiata* Linné.

Tellina masoni Tate

Tellina masoni Tate, 1887 b. Trans. Roy. Soc. S. Aust., 9, p. 165, pl. 16, fig. 6 a-b.

Tellina masoni Tate. Tate and Dennant, 1893. *id.* 17, (1), p. 225.

Tellina masoni Tate. Harris, 1897. Cat. Tert. Moll. Brit. Mus., 1, p. 387.

Tellina masoni Tate. Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 127.

Tellina masoni Tate. N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 151.

Tellina masoni Tate. Cressin, 1943. Min. Res. Surv. Bull., 9, p. 94.

Diagnosis—Transversely oblong, rather convex, umbo situated at posterior third. Anterior dorsal margin almost horizontal, anterior margin elongately rounded. Post-dorsal margin oblique, narrowly truncated at posterior. Ventral margin rounded, arched anteriorly and slightly incurved at the umbo-postventral edge. Left valve with a shallow concave depression behind the slight posterior carination.

Dimensions—Length 18, height 11, inflation (both valves) 6 mm.

Type Locality—Lower beds, Muddy Creek, Victoria; Miocene.

Location of Holotype—Tate Mus. Coll., Univ. of Adelaide, T 1212A.

Observations—This species was formerly recorded only from the Miocene. It has, however, been found in the Lower Pliocene of Gippsland (Cressin, 1943, p. 94), and in addition to the record of its occurrence from Abattoirs Bore, it is here recorded rather doubtfully from Weymouth's Bore, a single small valve being obtained.

Material—14 valves Abattoirs Bore. Three topotypes, Muddy Creek, Vict., 19865, B.M. Coll.; one left valve, Weymouth's Bore.

Stratigraphical Range—Miocene and Pliocene.

Geographical Distribution—Gippsland, Victoria — Adelaide, South Australia.

Tellina albinelloides (Tate)

pl. 5, fig. 12

Tellina albinelloides Tate, 1887 b. Trans. Roy. Soc. S. Aust., 9, p. 164, pl. 16, fig. 4 a-b.

Tellina albinelloides Tate. Harris, 1897. Cat. Tert. Moll. Brit. Mus., 1, p. 386.

Tellina albinelloides Tate. Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 139, 147.

Diagnosis—Inequivalve, umbones subcentral, right valve markedly depressed. Anterior-dorsal slope straight, inclined, anterior margin elongately rounded; posterior side rostrated, broader than anterior, dorsal margin less oblique, edge abruptly truncated. Sculpture of thin, narrow imbricating striae raised into thin, narrow, imbricating lamellae on the angulated posterior slope.

Dimensions—Length 44, height 22, inflation (both valves) 5.5 mm.

Type Locality—Upper Beds, Muddy Creek, Victoria; Pliocene.

Location of Holotype—Tate Mus. Coll., Univ of Adelaide, T 1211.

Material—Four complete, 2 broken valves, Weymouth's Bore 2 topotypes, B.M. Coll., No. 9864.

Stratigraphical Range—Pliocene.

Geographical Distribution—Gippsland, Victoria — Adelaide, South Australia,

Genus PSEUDARCOPIA Bertin, 1878

Pseudarcopagia Bertin 1878. Nouv. Arch. Mus. His. Nat., Paris, p. 264.

Type species (s.d. Cotton and Godfrey, 1935) *Tellina decussata* Lamarck
= *Pseudarcopagia victoriae* Gatliff and Gabriel

Pseudarcopagia detrita N. H. Woods

pl. 6, fig. 2

Pseudarcopagia detrita N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, pl. 149, pl. 9, fig. 9 (*lapsus calami* for *Pseudarcopagia*).

Diagnosis—Trigonal, inequilateral, broadly rounded anteriorly, shorter and somewhat truncated posteriorly, ventral margin straight. Sculpture of numerous fine radial striae bifurcating ventrally.

Dimensions—Length 4.8, height 4.2 mm.

Type Locality—Abattoirs Bore, Adelaide; Pliocene.

Location of Holotype—Tate Mus. Coll., Univ. of Adelaide, T 1677.

Material—Two right valves, Weymouth's Bore.

Stratigraphical Range—Dry Creek Sands.

Geographical Distribution—Abattoirs and Weymouth's Bores, Adelaide District.

Family SEMELIDAE

Genus SEMELE Schumacher, 1817

Semele Schumacher, 1817. Ess. vers. Test. p. 165, pl. 18, fig. 2.

(*Amphidesma* Lamarck, 1818. Anim. s. vert., 5, p. 490.)

Type species (monotypy) *Semele reticulata* Schumacher
= *Tellina proficua* Pulteney

Semele vesiculosa (Tate)

Semele vesiculosa Tate, 1887 b. Trans. Roy. Soc. S. Aust., 9, p. 169, pl. 16, fig. 12.

Semele vesiculosa Tate. Tate and Dennant, 1893. *id.* 17, (1), p. 225.

Semele vesiculosa Tate. Harris, 1897. Cat. Tert. Moll. Brit. Mus., (1), p. 388.

Semele vesiculosa Tate. Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 127.

Semele vesiculosa Tate. N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 151.

Diagnosis—Inequilateral, somewhat inflated, anterior side roundly produced, posterior side obtuse-angled. Right valve less convex than left. Post dorsal margin slightly arched, oblique; ventral margin broadly arched anteriorly and medially, slightly insinuated posteriorly.

Dimensions—Length 9, height 6, inflation (both valves) 5 mm.

Type Locality—Lower Beds, Muddy Creek, Victoria; Miocene.

Location of Holotype—Tate Mus. Coll., Univ of Adelaide, T 1199.

Material—Two valves, Hindmarsh Bore 4 topotypes, Muddy Creek, B.M. Coll., Nos. 9862.

Stratigraphical Range—Miocene; Dry Creek Sands.

Geographical Distribution—Port Phillip Bay, Victoria—Adelaide, South Australia.

Family DONACIDAE

Genus SOLECURTUS Blainville, 1824

Solecurtus Blainville, 1824. Dict. Sci. Nat., 32, p. 351.

Type species (s.d. Deshayes, 1829) *Solen strigilatus* Linné.

Solecurtus dennanti Tate

Solecurtus dennanti Tate, 1887 b. Trans. Roy. Soc. S. Aust., 9, p. 181, pl. 16, fig. 17.

Solenocurtus dennanti Tate, Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 126.

Solecurtus dennanti Tate, N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 151.

Diagnosis—Moderately convex, umbo situated at anterior third; anterior and posterior extremities approximately equally rounded, anterior dorsal margin slightly incurved, post-dorsal margin nearly straight, gently sloping and slightly narrowed towards the posterior margin. Sculpture of concentric growth lines, fine radial striae on the anterior and posterior and oblique distant lines about 1 mm. apart, which are nearly straight in the medial portion of the valve and curve gently to the post-dorsal slope.

Dimensions—Length 29.5, height 12.5 mm.

Type Locality—Lower Beds, Muddy Creek, Victoria; Lower Miocene.

Location of Holotype—Tate Mus. Coll., Univ of Adelaide, T 342.

Material—Nine fragments, Abattoirs Bore.

Stratigraphical Range—Lower Miocene; Dry Creek Sands.

Geographical Distribution—Port Phillip Bay, Victoria—Adelaide, South Australia.

Solecurtus subrectangularis N. H. Woods

pl. 6, fig. 10

Solecurtus subrectangularis N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 149, pl. 8, fig. 7.

Diagnosis—Small thin, slightly gaping, umbo situated at anterior two-fifths. Posterior side broad, expanded, post-dorsal margin horizontal and parallel to ventral border which is also horizontal; posterior margin truncate-rounded. Anterior narrower, anterior dorsal margin sloping at angle of about 30°, then steeply descending to the ventral border at the anterior margin. Surface sculptured with coarse concentric growth lines and crowded fine radial striae bifurcating towards the ventral margin.

Dimensions—Length 7.7, height 4.6 mm.

Type Locality—Abattoirs Bore, Adelaide; Pliocene.

Location of Holotype—Tate Mus. Coll., Univ of Adelaide, T 1684.

Material—Two excellently preserved right valves, Hindmarsh Bore.

Stratigraphical Range—Dry Creek Sands.

Geographical Distribution—Abattoirs and Hindmarsh Bores, Adelaide.

Superfamily MACTRACEA

Family MACTRIDAE

Genus MACTRA Linné, 1767

Maetra Linné, 1767. Syst. Nat. ed., 12, p. 1,125.

Type species (s.d. Fleming, 1818) *Maetra stultorum* Linné

Subgenus ELECTROMACTRA Iredale, 1930

Electromactra Iredale, 1930 Rec. Aust. Mus., 17, (9), p. 400.

Type species (c.d.) *Maetra parkesiana* Hedley

***Maetra* (*Electromactra*) *howchiniana* Tate**

pl. 4, fig. 8

Maetra howchiniana Tate, 1887 b. Trans. Roy. Soc. S. Aust., 9, p. 171, pl. 17, fig. 3 a, 3 b.

Maetra howchiniana Tate. Tate and Dennant. *id.* 17, (1), p. 225.

Maetra howchiniana Tate. Harris, 1897. Cat. Tert. Moll. Brit. Mus., 1, p. 380.

Maetra howchiniana Tate. Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 126, 147.

Maetra howchiniana Tate. N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 151.

Maetra howchiniana Tate. Crespin, 1943. Min. Res. Surv. Bull., 9, p. 93.

Diagnosis—Elongate-ovate, attenuated at both ends, umbo at about three-eighths from anterior; anterior-dorsal margin slightly concave, post-dorsal margin slightly arched, ventral margin almost straight medially, ascending more rapidly posteriorly than anteriorly. Posterior side somewhat produced.

Dimensions—Length 41, height 23, inflation (both valves) 12 mm.

Type Locality—Lower Beds, Muddy Creek, Victoria; Miocene.

Location of Holotype—Tate Mus. Coll., Univ of Adelaide, T 1195.

Observations—Tate (1887b, p. 171) has noted that large numbers of young shells of this species are not uncommon in the calciferous sand-rock of the River Murray cliffs near Morgan. This may also be said of certain borings in the Adelaide District. In both Abattoirs and Hindmarsh Bores, very many juvenile examples were recovered, although in Weymouth's Bore not one valve was found. In other borings with a less numerous molluscan fauna, the species appears in small numbers, but with relative constancy. The species is long-ranging and widely occurring; in the Gippsland area it has been recorded from the "Mitchellian" and "Kalimnan" only.

Material—Two specimens Lower Beds, Muddy Creek, L.9880, B.M. Coll., numerous specimens Hindmarsh and Abattoirs Bores.

Stratigraphical Range—Lower Miocene to Pliocene.

Geographical Distribution—Gippsland, Victoria—Adelaide, South Australia.

Genus ANAPELLA Dall, 1895

Anapella Dall, 1895. Proc. Mal. Soc. Lond., 1, (5), p. 213.

Type species (o.d.) *Anapa triquetra* Hanley

***Anapella variabilis* Tate**

Anapa variabilis Tate, 1887 b. Trans. Roy. Soc. S. Aust., 9, p. 172, pl. 17, fig. 5 a-b.

Anapella variabilis Tate, Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 139.

Anapella variabilis Tate. Cotton, 1947. Rec. S. Aust. Mus., 8, (4), p. 655.

Diagnosis—Ovately trigonal, inequilateral, posterior side longer, bluntly rounded, anterior side rounded, front dorsal slope slightly incurved.

Dimensions—Length 17.5, height 13.5, inflation (both valves) 11 mm.

Type Locality—Oyster Banks, Blanche Point, Aldinga Bay, South Australia; Pliocene.

Location of Holotype—Tate Mus. Coll., Univ of Adelaide, T 1209.

Material—Two valves, Holden's Bore, 355-380 feet.

Stratigraphical Range—South Australian Pliocene.

Geographical Distribution—Aldinga Bay and Adelaide, South Australia.

Genus ZENATIOPSIS Tate, 1879

Zenatiopsis Tate, 1879. Trans. Phil. Soc. Adel. for 1878/9, p. 129.

Type species (monotypy) *Zenatiopsis angustata* Tate

Zenatiopsis angustata Tate

- Zenatiopsis angustata* Tate, 1879. Trans. Phil. Soc. Adel. for 1878/9, p. 129, pl. 5, fig. 6.
Zenatiopsis angustata Tate, 1887 b. Trans. Roy. Soc. S. Aust., 9, p. 172.
Zenatiopsis angustata Tate. Harris, 1897. Cat. Tert. Moll. Brit. Mus., 1, p. 381.
Zenatiopsis angustata Tate. Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 126, 139, 147.
Zenatiopsis angustata Tate. N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 151.

Diagnosis—Compressed, narrowly oblong, anterior side very short, rounded; posterior side long, rounded. Umbo anterior, supported internally by a thick rib extending half way across the valve; narrowly gaping at both ends; cartilage plate prominent, cardinal teeth distinct. Lateral teeth absent. Sculpture of fine growth plications and numerous crowded fine striae.

Dimensions—Length 46, height 18, length of anterior side 6 mm.

Type Locality—Upper Beds, River Murray Cliffs, near Morgan; Pliocene.

Location of Holotype—Tate Mus. Coll., Univ of Adelaide, T 1205.

Material—Portions of three valves, Weymouth's Bore.

Stratigraphical Range—Miocene to Pliocene.

Geographical Distribution—Gippsland, Victoria—Adelaide, South Australia.

Suborder **ASTHENODONTA**Superfamily **MYACEA**Family **CORBULIDAE**Genus **CORBULA** Bruguière, 1797

- Corbula* Bruguière, 1797. Ency. Meth. vers., 2, pl. 230.
 (*Aloidis* Megerle, 1811. Ges. Naturf., Berlin, Mag., 5, p. 67.)
 (*Notocorbula* Iredale, 1930. Rec. Aust. Mus., 17, p. 404.)

Type species (s.d. Schmidt, 1818) *Corbula sulcata* Lamarck

Corbula ephamilla Tate

pl. 4, fig. 4, 5, 6, 7

- Corbula sulcata* Lamarck. McCoy, 1865. Ann. Mag. Nat. Hist., ser. 3, 16, p. 114.
Corbula sulcata Lamarck. Tenison-Woods, 1876. Pap. Roy. Soc. of Tas. for 1875, p. 16.
Corbula sulcata Lamarck. Etheridge, R., Jr., 1878. Cat. Aust. Ross., p. 154.
Corbula ephamilla Tate, 1885. Proc. Roy. Soc. Tas. for 1884, p. 229.
Corbula ephamilla Tate, 1887 b. Trans. Roy. Soc. S. Aust., 9, p. 176, pl. 17, fig. 13 a-b, 14.
Corbula ephamilla Tate. Tate and Dennant. *id.* 17, (1), p. 225.
Corbula ephamilla Tate. Pritchard, 1896. Proc. Roy. Soc. Vict., 8, (n.s.), p. 140.
Corbula ephamilla Tate. Harris 1897. Cat. Tert. Moll. Brit. Mus., 1, p. 382.
Corbula ephamilla Tate. Dennant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 126, 139, 147.
Corbula ephamilla Tate. N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 181.
Aloidis (*Notocorbula*) *ephamilla* (Tate). Cressin, 1943. Min. Res. Surv. Bull., 9, p. 91.

Diagnosis—Solid, very inequivalve; posterior margin obliquely truncated, right valve with more than 20 very thick, rounded prominent concentric ridges, ridges and interspaces with numerous fine, somewhat irregular concentric striae. Left valve ovately triangular, nearly flat, pointed posteriorly, surface with irregular growth striae. Shells easily decorticated, surface after decortication smooth with only faint ridges.

Dimensions—Length 21, height 16, inflation (both valves) 10 mm.

Type Locality—River Murray Cliffs, Morgan, South Australia; Miocene.

Location of Holotype—Tate Mus. Coll., Univ. of Adelaide, T. 335.

Observations—The name *Corbula* was first published in 1797 by Bruguière at the head of plate 230 of the Ency. Meth., figuring several species of the genus, without specific names or generic description. Röding published the name in 1798 for a genus determined by both Winckworth (March, 1930, p. 15) and Iredale (June 1930 p. 404) as a synonym of *Asaphis* Modeer, 1793. Lamarck diagnosed *Corbula* of Bruguière in 1799 (p. 8), the type species *C. sulcata* being designated by Schmidt (1818, p. 17) and later by Gray (1847, p. 191). Under earlier

determinations of the International Rules of Zoological Nomenclature Bruguière's genus was invalid, although the name was accompanied by sufficient figures to make the import obvious. Lamarck's name then became a homonym of *Corbula* Röding, and the next available name was *Aloidis* of Megerle. *Aloidis* has been accepted and employed by several authors on these grounds, but by a recent amendment of the International Rules a genus is valid if introduced with an indication, and *Corbula* Bruguière is acceptable under this amendment.

Material—Twelve valves, Weymouth's Bore; 11 valves including the hypotypes figured pl. 4, figs. 4, 5, 7; 22 valves Lower Beds, Muddy Creek, and 8 valves Lower and Upper Beds, Muddy Creek, B.M. Coll.

Stratigraphical Range—Miocene to Upper Pliocene.

Geographical Distribution—Gippsland, Victoria—Adelaide, South Australia.

Corbula adelaidensis nom. nov.

pl. 6, fig. 11

Corbula equivalis N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 150, pl. 8, fig. 8, 9 (non Philippi, 1836).

Diagnosis—Elongate-ovate, nearly twice as long as high, equivalve; umbo at anterior third. Posterior side produced, weakly keeled. Surface sculptured with fine irregular concentric striae.

Dimensions—Length 14.2, height 9.3.

Type Locality—Abattoirs Bore, Adelaide; Pliocene.

Location of Holotype—Tate Mus. Coll., Univ. of Adelaide, T. 1682.

Observations—The Recent *Corbula flindersi* (Cotton) is very close to this species, which is, however, more equivalve and more strongly sculptured. The species known as *Corbula coxi* Pilsbry identified from the Kalimnan of Victoria (and not *C. coxi*) is the nearest fossil ally. The name *equivalvis* N. H. Woods is a homonym of *equivalvis* employed by Philippi for a Cuban shell.

Material—Two valves, Weymouth's Bore; 1 complete specimen, 30 valves and several portions of valves, Hindmarsh Bore.

Stratigraphical Range—Dry Creek Sands.

Geographical Distribution—Adelaide District.

Family HIATELLIDAE

Genus HIATELLA Daudin, 1801

Hiatella Daudin, 1801, in Rosc., Hist. Nat. des Coq., 3, p. 120.
(*Saxicava* Bellevue, 1802. Journ. Phys., 54, p. 5.)

Type species (s.d. Children 1823) *Mya arctica* Linné.

Hiatella australis (Lamarck)

pl. 5, fig. 10

Corbula australis Lamarck, 1818. Anim. s. Vert., 5, p. 495.

Saxicava australis Lamarck, ibid., p. 502.

Saxicava veneriformis, ibid., p. 502.

Corbula australis Lamarck, Blainville, 1825, Man. de Malac., p. 561, pl. 78, fig. 3.

Corbula australis Lamarck 1835. Anim. s. vert. (ed. 2 Deshayes and Edwards), 6, p. 138, No. 1.

Saxicava australis Lamarck, Reeve, 1875. Conch. Icon., 20, pl. 2, fig. 8.

Saxicava australis Lamarck, Hutton, 1880. Man. N.Z. Moll., p. 134.

Saxicava australis Lamarck. Tate, 1886. Trans. Roy. Soc. S. Aust., 8, pl. 12, fig. 8.

Saxicava arctica Linné. Tate, 1887. id. 9, p. 178.

Saxicava arctica Linné. Demant and Kitson, 1903. Rec. Geol. Surv. Vict., 1, (2), p. 126, 139, 147.

Saxicava australis Lamarck, N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 151.

Hiatella australis Lamarck, Cotton and Godfrey, 1938. Moll., S. Aust., p. 284.

Diagnosis—Usually ovate-oblong, very inequilateral, rugose, posterior side longer, sculpture of irregular, concentric raised, often anastomosing riblets, crowded anteriorly, distant and rather lamellar posteriorly.

Dimensions—Very variable, an average South Australian example measures length 37, height 26, inflation 22 mm.

Type Locality—King George Sound, W. Aust.; Recent.

Location of Holotype—Mus. Hist. nat. Paris.

Observations—As a footnote to 6, p. 138, of the 1835 edition of Lamarck's *Anim. s. Vert.* Deshayes and Edwards have explained that the shell described by Lamarck is not a *Corbula* but a *Saxicava*, Lamarck having failed to notice that the ligament is external, the valves are gaping, irregular, unequal and that the hinge has a projecting tooth characteristic of most of the *Saxicavas*. As a footnote to p. 153, Deshayes and Edwards have expressed the view that *Corbula australis*, *Saxicava australis*, and *S. veneriformis* are one and the same species; as they remark, "such diverse forms deceive the most talented observers, particularly when they have examined only a small number of individuals. The three species should be united." Hanley disagreed (1843, p. 51) with this view on the evidence of Blainville's figures, but as Deshayes and Edwards had presumably seen the actual specimens, authors have followed their opinion, and the specimen originally described as *Corbula australis* is accepted as type.

Material—Three valves, Hindmarsh Bore.

Stratigraphical Range—Miocene to Recent.

Geographical Distribution—Australia, New Zealand, America.

Hiatella angasi (Angas)

pl. 5, fig. 13, 14

Saxicava angasi Angas ex Adams, 1865. Proc. Zool. Soc., p. 643.

Saxicava angasii Adams. Sowerby, 1878. Conch. Icon., 20, pl. 2, fig. 11.

Saxicava subalata N. H. Woods, 1931. Trans. Roy. Soc. S. Aust., 55, p. 151.

Hiatella angasi Adams. Cotton and Godfrey, 1938. Moll. S. Aust.

Diagnosis—Irregularly rhomboidal, anterior side very short, anterior dorsal edge steeply sloping to the rounded ventral edge. Post-dorsal margin straight, posterior side oblong, inflated, gaping, rectangular on posterior edge.

Dimensions—Length 53.5, height 35.5, inflation (both valves), 25 mm.

Type Locality—Oyster banks, Port Lincoln, South Australia, living in sandy mud at from 5 to 8 fathoms; Recent.

Location of Holotype—British Museum (Natural History).

Observations—The small species occurring in the Dry Creek Sands was previously identified by the writer with the Victorian *subalata* Gatliff and Gabriel. Comparison with authentic specimens of *subalata* and with the holotype of *angasi* leads to the opinion that the fossil shells are small examples of *angasi*. They are thicker, stouter, more gaping, less regular than, and lack the granulation characteristic of *subalata*.

Material—Holotype; 2 complete valves, one portion, Hindmarsh Bore.

Stratigraphical Range—Dry Creek Sands and Recent.

Geographical Distribution—St. Vincent Gulf, South Australia.

SUSPENSE LIST

The following species have been recorded by Cotton from the Dry Creek Sands. As the material cannot now be traced, they are not included in the foregoing list, particularly as in one or two cases there are several species which closely resemble one another and confusion is possible.

Glycymeris (Voletuceta) subadians Basedow.

Amusium lucens (Tate).

Lithophaga brevis (Tate), pl. 6, fig. 13. As the holotype has never been figured, opportunity is taken here of doing so.

Gonimyrtea araea (Tate). The holotype of this species has wholly disintegrated, and identification is impossible.

Loripes simulans Tate.
 "Kellia" *planiuscula* Tate.
Bassina paucirugata (Tate).
Plebidonax depressa (Tate).

Brachidontes submenkeanus (Tate)

pl. 6, fig. 12

Mytilus submenkeanus Tate. 1886. Trans. Roy. Soc. S. Aust., 8, p. 124.

Mytilus submenkeanus Tate. Dennant and Kitson, 1903. Rec. Geol. Surv. Vict, 1, (2), p. 139.

Brachyodontes submenkeana Tate. Cotton, 1947. Rec. S. Aust. Mus., 8, (4), p. 655.

Diagnosis—Sculptured with about eight broad, longitudinal ribs.

Description of Syntypes—Shell subtrigonal, probably narrow, umbonal-ventral ridge smooth, posterior to ridge without longitudinal ribs and sculptured only with growth folds. From ridge to anterior border about eight radiating broad longitudinal ribs which appear to be slightly tuberculated by the growth folds towards the ventral border.

Dimensions (estimated from syntypes)—Height 35 mm., width 10 mm.

Type Locality—Hallett Cove; Pliocene.

Location of Syntypes—Tate Mus. Coll., Univ. of Adelaide, T 994.

Observations—This species has never been fully described or figured. Material available for description is still very poor, but opportunity is here taken of describing the syntypes and of figuring them.

Material—Three syntypes.

Stratigraphical Range—Pliocene.

Geographical Distribution—Hallett Cove, South Australia.

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EXPLANATION OF PLATES

PLATE I

- Fig. 1. *Nucula (Ennucula) kalimnae* Singleton. Weymouth's Bore, left valve, external view, x 2.6.
- Fig. 2. *Nucula (Ennucula) kalimnae* Singleton. Weymouth's Bore, left valve, internal view, x 2.6.
- Fig. 3. *Nucula (Ennucula) beachportensis* Verco. Hindmarsh Bore, left valve, external view, x 8.6.
- Fig. 4. *Nucula (Ennucula) beachportensis* Verco. Hindmarsh Bore, left valve, internal view, x 8.6.
- Fig. 5. *Nuculana woodsi* (Tate). Hindmarsh Bore, right valve, x 4.3.
- Fig. 6. *Nuculana crebrecostata* T. Woods. Abattoirs Bore, left valve, x 3.4.
- Fig. 7. *Nuculana verconis* Tate. Abattoirs Bore, right valve, x 3.4.
- Fig. 8. *Cucullaea corioensis* McCoy. Weymouth's Bore, juvenile, left valve, x 8.6.
- Fig. 9. *Cucullaea corioensis* McCoy. Weymouth's Bore, adult, left valve, x 1.4.
- Fig. 10. *Limopsis maccoyi* Chapman. Tennant's Bore, right valve, x 1.7.
- Fig. 11. *Limopsis eucosmus* Verco. Weymouth's Bore, right valve, x 8.6.
- Fig. 12. *Limopsis vixornata* Verco. Weymouth's Bore, left valve, x 7.
- Fig. 13. *Lentipecten adelaidensis* sp. nov. Abattoirs Bore: a, holotype x 1.7; b, parasynotype, right valve, x 0.9; c, parasynotype, left valve, x 0.9.
- Fig. 14. *Lissarca rubricata* (Tate). Hindmarsh Bore, right valve, x 7.
- Fig. 15. *Cuna polita* (Tate). Hindmarsh Bore, right valve, x 8.6.
- Fig. 16. *Lissarca rhomboidalis* Verco. Hindmarsh Bore, right valve, x 8.6.
- Fig. 17. *Myadora corrugata* Tate. Weymouth's Bore, left valve, x 3.4.
- Fig. 18. *Condylocardia tenuicostae* Chapman and Gabriel. Hindmarsh Bore, left valve, external view, x 8.6.
- Fig. 19. *Condylocardia tenuicostae* Chapman and Gabriel. Hindmarsh Bore, left valve, internal view, x 8.6.
- Fig. 20. *Sportella jubata* Hedley. Hindmarsh Bore, left valve, x 3; hinge x 3.4.

PLATE II

- Fig. 1. *Spondylus spondyloides* Tate. Weymouth's Bore, x 1.4; left hinge, x 1.4.
- Fig. 2. *Cardita compta* (Tate). Weymouth's Bore, right valve, x 1.7.
- Fig. 3. *Pleuromeris subpecten* sp. nov., holotype, x 4.3.
- Fig. 4. *Pleuromeris trigonalls* (Tate). Weymouth's Bore, x 3.4; hinge, x 4.3.
- Fig. 5. *Cyclocardia (Scalaricardita) subcompacta* (Chapman and Crespin). Weymouth's Bore, x 3.4; hinge, x 5.1.
- Fig. 6. *Glans dennanti* (Chapman and Crespin). Weymouth's Bore, x 1.4.
- Fig. 7. *Cyclocardia (Arcturellina) peridonea* sp. nov., holotype. Hindmarsh Bore, x 3; hinge, x 4.3.
- Fig. 8. *Cyclocardia (Scalaricardita) subcompacta* (Chapman and Crespin), juvenile. Weymouth's Bore, x 7; hinge, x 8.6.
- Fig. 9. *Cyclocardia (Arcturellina) hindmarshensis* sp. nov., holotype. Hindmarsh Bore, x 3; hinge, x 4.3.
- Fig. 10. *Callucina balcombica* (Cossmann). Weymouth's Bore, right valve, internal and external views, x 1.7; left hinge, x 3.4.
- Fig. 11. *Eomiltha (Gibbolucina) confirmans* sp. nov., holotype. Hindmarsh Bore, x 2.6; hinge, x 3.4.
- Fig. 12. *Gomimyrtia salisburyensis* sp. nov., holotype. Abattoirs Bore, external and internal views, x 1.7; right hinge, x 2.6.
- Fig. 13. *Monitilora (Prophetilora) chavani* sp. nov., holotype. Abattoirs Bore, x 1.7; left hinge, x 2.6; right hinge, x 1.7.
- Fig. 14. *Linga (Bellucina) nuciformis* (Tate). Abattoirs Bore, right valve, x 2.1.
- Fig. 15. *Linga (Bellucina) nuciformis* (Tate). Abattoirs Bore, internal view, x 2.1; left hinge, x 2.6.
- Fig. 16. *Myrtea fabuloides* (Tate). Abattoirs Bore, right valve, x 2.6; left hinge, x 2.6; right hinge, 2.6.

PLATE III

- Fig. 1. *Monitilora idonea* sp. nov. Hindmarsh Bore, holotype, exterior view, x 2.1.
 Fig. 2. *Monitilora idonea* sp. nov. Hindmarsh Bore, holotype, interior view, x 1.7.
 Fig. 3. *Gonimyrtea crassior* sp. nov. Weymouth's Bore, holotype, x 2.6; hinge, x 3.4
 Fig. 4. *Gonimyrtea crassior* sp. nov., paratype. Hindmarsh Bore, x 3.
 Fig. 5. *Gonimyrtea validior* sp. nov., holotype. Hindmarsh Bore, external view, x 2.6;
 hinge, paratype, x 2.6.
 Fig. 6. *Gonimyrtea validior* sp. nov., holotype. Hindmarsh Bore, internal view, x 2.6.
 Fig. 7. *Gonimyrtea notabilior* sp. nov., holotype. Hindmarsh Bore, external view, x 2.6;
 hinge, x 2.6.
 Fig. 8. *Gonimyrtea notabilior* sp. nov., paratype, internal view, x 2.6.
 Fig. 9. *Divalucina cumingi* (Adams and Angas). Weymouth's Bore, x 1.4.
 Fig. 10. *Bornia trigonale* (Tate). Hindmarsh Bore, left valve, x 8.6; hinge, 8.6.
 Fig. 11. *Litigiella adelaidensis* sp. nov., holotype. Hindmarsh Bore, x 6.
 Fig. 12. *Mylitta hindmarshensis* sp. nov., holotype. Hindmarsh Bore, x 8.6; hinge, x 12.
 Fig. 13. *Properycina tarrensis* sp. nov., holotype. Hindmarsh Bore, x 6; right hinge
 (on left), left hinge (on right), x 6.
 Fig. 14. *Mysella anomala* Angas. Abattoirs Bore, right valve, x 3.4; hinge, x 4.3.
 Fig. 15. *Montacuta sericea* Tate. Hindmarsh Bore, right valve, x 3; hinge, x 4.
 Fig. 16. *Nemocardium (Pratulium) proterothetidis* sp. nov., holotype. Abattoirs Bore, x 3.4.
 Fig. 17. *Nemocardium (Pratulium) proterothetidis* sp. nov., holotype. Abattoirs Bore, internal
 view, x 3.4.
 Fig. 18. *Tawera incurvilamellata* sp. nov., holotype. Abattoirs Bore, external view, x 2.6.
 Fig. 19. *Tawera incurvilamellata* sp. nov., holotype. Abattoirs Bore, internal view, x 2.6.
 Fig. 20. *Tawera gallinula* Lamarck. Abattoirs Bore, right valve, x 2.6; hinge, x 2.6.

PLATE IV

- Fig. 1. *Glans spinulosa* (Tate). Abattoirs Bore, x 1.4.
 Fig. 2. *Placamen subroborata* (Tate). Muddy Creek, Victoria, left valve, x 1.4.
 Fig. 3. *Placamen subroborata* (Tate). Weymouth's Bore, juvenile, right valve, x 2.6.
 Fig. 4. *Corbula ephamilla* Tate. Hindmarsh Bore, right valve, external view, x 1.7.
 Fig. 5. *Corbula ephamilla* Tate. Hindmarsh Bore, right valve, internal view, x 1.7.
 Fig. 6. *Corbula ephamilla* Tate. Abattoirs Bore, both valves, x 2.1.
 Fig. 7. *Corbula ephamilla* Tate. Hindmarsh Bore, left valve, x 2.1.
 Fig. 8. *Maetra (Electromaetra) howchiniana* Tate. Hindmarsh Bore, x 1.7.
 Fig. 9. *Macoma ralphii* (Finlay). Weymouth's Bore, left valve, external view, x 1.7.
 Fig. 10. *Macoma ralphii* (Finlay). Weymouth's Bore, left valve, internal view, x 1.7.
 Fig. 11. *Anomia tatei* Chapman and Singleton. Abattoirs Bore, x 0.85.
 Fig. 12. *Vasticarium (Regozara) praecygnorum* sp. nov., holotype. Dry Creek Bore, right
 valve, x 1.7.
 Fig. 13. *Fulvia tenuicostata* (Lamarck). Dry Creek Bore, right valve, x 1.7.
 Fig. 14. *Cardita subdeceptiva* sp. nov., holotype. Dry Creek Bore, x 0.85.
 Fig. 15. *Brachidontes hirsutus* (Lamarck). Abattoirs Bore, left valve, juvenile, x 2.6.
 Fig. 16. *Chlamys (Chlamys) polyaktinos* sp. nov., holotype. Abattoirs Bore, x 1.7.
 Fig. 17. *Gari hamiltonensis* (Tate). Abattoirs Bore, juvenile, x 3.4.
 Fig. 18. *Vasticardium submaculosum* sp. nov., holotype. Weymouth's Bore, x 1.7.
 Fig. 19. *Chioneryx demanti* (Chapman and Crespin). Weymouth's Bore, x 1.7.

PLATE V

- Fig. 1. *Ostrea (Lopha) hyotidoidea* Tate. Abattoirs Bore, x 0.85.
 Fig. 2. *Notocallista (Striacallista) mollesta* Marwick. Abattoirs Bore, x 0.85.
 Fig. 3. *Notocallista (Striacallista) pestis* Marwick. Weymouth's Bore, x 2.1.
 Fig. 4. *Eucrassatella camura* (Pritchard). Kooyonga Bore, x 0.85.
 Fig. 5. *Dosina (Hina) cainozoica* Tenison-Woods. Weymouth's Bore, x 1.4.

- Fig. 6. *Eucrassatella kingicoloides* (Pritchard). Kooyonga Bore, x 0.85.
 Fig. 7. *Limopsis beaumariensis* Chapman. Abattoirs Bore, x 1.4.
 Fig. 8. *Chlamys (Mesopeplum) incerta* Tenison-Woods. Weymouth's Bore, right valve, x 1.7.
 Fig. 9. *Chlamys (Mesopeplum) incerta* Tenison-Woods. Weymouth's Bore, left valve, x 1.7.
 Fig. 10. *Hiatella australis* (Lamarck). Hindmarsh Bore, x 3.7.
 Fig. 11. *Chlamys (Chlamys) antiaustralis* Tate. Kooyonga Bore, x 0.85.
 Fig. 12. *Tellina albinelloides* Tate. Immature specimen, Weymouth's Bore, x 1.7; hinge, x 2.6.
 Fig. 13. *Hiatella angasi* (Angas). Hindmarsh Bore, internal view, x 4.
 Fig. 14. *Hiatella angasi* (Angas). Hindmarsh Bore, external view, x 3.7.
 Fig. 15. *Cucullaea praelonga* Singleton. Kooyonga Bore, x 0.85

PLATE VI

- Fig. 1. *Nucula venusta* N. H. Woods. Holotype. Abattoirs Bore, x 4.3.
 Fig. 2. *Pseudarcopagia detrita* N. H. Woods. Holotype. Abattoirs Bore, x 4.3.
 Fig. 3. *Eomiltha (Gibbolucina) salebrosa* (N. H. Woods). Holotype. Abattoirs Bore, x 0.85.
 Fig. 4. *Diplodonta solitaria* N. H. Woods. Holotype. Abattoirs Bore, x 1.1.
 Fig. 5. *Tawera pernitida* (N. H. Woods). Abattoirs Bore, x 2.1.
 Fig. 6. *Thyasira sinuata* (N. H. Woods). Holotype. Abattoirs Bore, x 2.2.
 Fig. 7. *Mysella tellinoides* (N. H. Woods). Holotype. Abattoirs Bore, x 5.1.
 Fig. 8. *Mysella macer* (N. H. Woods). Holotype. Abattoirs Bore, x 2.6.
 Fig. 9. *Gafrarium perornatum* N. H. Woods. Holotype. Abattoirs Bore, x 2.6.
 Fig. 10. *Solecurtus subrectangularis* N. H. Woods. Holotype. Abattoirs Bore, x 3.
 Fig. 11. *Corbula adelaidensis* nom. nov. Holotype. Abattoirs Bore, x 1.7.
 Fig. 12. *Brachidontes submenkeanus* (Tate). Syntypes. Hallett Cove, x 0.85.
 Fig. 13. *Lithophaga brevis* (Tate). Holotype. Hallett Cove, x 1.4.
 Fig. 14. *Lima bassi* Tenison-Woods. Abattoirs Bore, x 2.6.
 Fig. 15. *Properycina micans* (Tate). Hinge, x 8.6.